

Weeks, Land Economics

**FOUND
AS
SCANNED**

Murray Farm Appraisal

Part II

Ch. 12, Capitalization.

Where just a few years diverge from cost expectation, use simple formula & adjust for those years by $\pm$ adding diff., discounted.

What i.r. should be used? I say lowest around -- but gets into question of social desirability of allocation, good, take off.

They talk of appraisal difficulties, foreseeing future P, suggest moving ave. I say, just assess for one year, avoid i.r., projection, etc.

Nothing in it, but most obvious rapid generalities.

Renne, Chap. 17

Pt. of opt~~ize~~ intensity, where $MR = MC$. & conservation is included in costs & revenues, discounted.

Some hint that social mr lower than individuals. (Depends on individual. A few borrow from govt. Must lend to govt. But govt's mr no social optimum either -- $\pm$ As with govt credit. Is no social time pref, just social int. in good cap mnts.)

$\neq$ low, fund, & biolog. resources. - biol. differ because can be $\pm$ Ad ~~ad~~ Δ by human action.

Tenancy as cause of depletion.

SCS, fdd. '35. SC districts. Taylor Grazing Districts.

AAA conserv. incentive payments.

Depreciation

$$V = \frac{a}{r}$$

$$a = a' + kV, \text{ where } kV \text{ is depreciation, \& } a' \text{ is other yields.}$$

$$Vr = a' + kV; \quad V(r-k) = a'; \quad V = \frac{a'}{r-k}$$

This applies where we want to find Value; we know gross yields; & we have some formula for deprec. as $f(\text{value, current})$. How does this tie in with depreciation formulae? They take original value

Why is deprec. relevant to valuation? Finite life, $V = \sum \frac{a_n}{(1+i)^n}$

where a is total ~~net~~ net yield --- not net of deprec.

Thorn, in $\frac{a}{r}$, would use a higher r , to account for finite life; & intangible depreciation. Vague

I can't see applying sinking fund to land value, or any other deprec. formula that assumes complete deprec. Only part of r.e. value should be depreciated.

You might apply formula to value each yr, as tho you were just starting a sinking fund formula depreciation from that value. But sinking fund formula implies starting from original value, & continuing to depreciate some % of that value annually --- so how can you take a % of present value each yr? Maybe by using another formula designed for that. But figures in his table are for % of original value. (p. 176)

Mason Gaffney

PROPOSED PRACTICES FOR ALLOCATING RESOURCES AMONG GOVERNMENT PROJECTS

I. Objective: to find uniform principles for most economically allocating limited government resources among alternative projects, with the purpose of getting the greatest benefits from the resources.

II. Definitions of Benefits and Costs

A. Basic assumptions in definitions

1. Evaluations of benefits and costs are from an overall social viewpoint. This implies:

a, Project accounting is not just like private business accounting, in that project benefits may exceed the sale value of the project output. The project may be justified without making a business "profit".

b, Project benefits should not accrue to the benefit of any restricted group of resource owners, but should accrue equally to all citizens, insofar as this is possible. If this is not possible, the social value of the project is dubious.

Benefits that accrue to mobile factors, like labor and capital, are not restricted, since outside labor and capital can immigrate to take advantage of the project benefits and thereby drive down the wage and interest levels in the project area to the national level, (and in small measure raise the national levels).

Benefits that accrue to immobile factors, notably land, are restricted to the land in the project area, since land cannot immigrate. Immigration of labor and capital further adds to land rents. The increased rents thus created can hardly be called benefits from the broad social viewpoint, since they accrue to selected individuals, rather than to society as a whole.

Increased rents can be converted into a social benefit if they are taxed to finance the project. In the rest of this outline I shall assume that this may be done, and treat increased rents as part of project benefits. Let me stress, however, that unless they are taxed, increased rents are hardly a benefit from the broad social viewpoint.

2. Benefits and costs are evaluated in terms of money values in free markets.

a. This is not the same as saying a project must be justified in the same terms as a private business. In justifying a project we consider also the non-salable benefits. However we try to measure these non-salable benefits in terms of money values. We try to avoid vague references to "non-economic" values, and to find economic measures for the benefits that are often referred to in this way.

b. We recognize no ultimate "intangible" -- i.e. non-measurable -- values. We concede that some values are more difficult to measure than others, but we insist that they can only be made commensurable by placing some money value on them. We observe that those who refuse to place money values on "intangibles" are, in effect, giving them money values in the decisions which they make. The weight given the "intangible" in the decision is a money value. Economic values are simply expressions of one item's worth in terms of another item. When an "intangible" item is weighed against money values it is in effect being given a money value. It is better to admit that we are doing this from the start, and face the dangers and difficulties directly. Otherwise the door is left open to unlimited airing of personal scales of values which have no social relevance.

c. The assumption used in much national income analysis that the benefits from government services just equal their cost is arbitrary and indefensible. It will be shown that this is only true of marginal government services when government has unlimited funds at its disposal. In reality, the benefits from most projects greatly exceed the costs.

d. Benefits and costs should be measured in money values prevalent at the time the costs are incurred, and the benefits expected. These money values should be deflated to adjust for general changes in the price level. If, for example, a general inflation is anticipated, the higher money value of project benefits anticipated in the future cannot be compared directly with today's money costs. The future money values must be deflated to "real" values, insofar as this is possible. If, on the other hand, the value of project services relative to other goods is expected to rise in the future, these higher prices are directly comparable to costs incurred today.

e. Future values must be discounted at some rate of interest. The common practice of supplying interest-free funds to projects is uneconomical, and would have resulted in a waste of resources were it not that project benefits were habitually underestimated and the two errors offset one another in some rough fashion.

The interest rate on risk free government bonds is not a correct rate for discounting future project benefits. It is too low. Government bonds have a low interest rate because they are considered riskless, thanks to the tax power of government.

Future benefits from public projects are by no means riskless. Risk must be provided for somehow, and a high discount of expected future yields is the conventional and I think adequate method.

The correct interest rate to use, then, depends on the risks in the individual project, and is a matter for fine judgment on the part of those most familiar with the project.

Discount of future values limits the weight given to future values, and thus effectively limits the planning period. No arbitrary limit beyond this need be imposed.

Limiting the planning period is dangerous. A large dam, for example, may cause a large community to grow, and millions of dollars worth of capital to be sunk into roads, houses, etc. If the dam will silt up in 75 years, and no alternative site will be available, a tremendous cost may be expected at that time.

f. The cost of hiring labor should be taken as the wages demanded by labor, regardless of employment conditions. It has been said that unemployed labor has no opportunity cost, hence the social cost of employing it is zero. However labor always has the alternative of leisure, and the value placed on leisure is reflected in the wages demanded by labor.

Reductions in unemployment compensation expenditures may be deducted from costs, however.

B. Definitions of Benefits and Costs

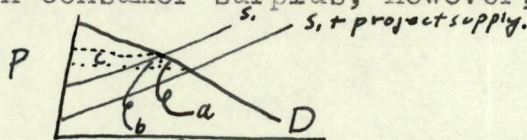
1. Benefits, net of associated costs. (All benefits are calculated on the assumption that optimum associated costs will be made, but

are net of those costs. This is analogous to the procedure used in defining "marginal net product" in economics)

a. Immediate project output. These are benefits realized on lands served directly by the project, and because they are served directly by the project. (extended benefits that happened to be realized on lands served directly by the project would not be counted as immediate project output)

1. Salable output. (Value is price times quantity)
2. Value of salable output above and beyond its price. (consumer surplus).

Recognition of consumer surplus implies that the project results in lower price for the project output in the area served. This will cause a loss of producer surplus to former suppliers, if any, of the project service. This loss will not be as great as the gain in consumer surplus, however, as shown on the following graph:



Gross gain in consumer surplus is $a + b + c$. But c is a loss of producer surplus, so net gain is $a + b$.

The net gain is increased consumer surplus minus reduced producer surplus.

3. Unsalable output.

This item, together with item #2, is reflected in and measured by increased rents in the project area.

b. Extended benefits. These are benefits realized on lands not necessarily served directly by the project.

1. Benefits to consumers of the goods produced in the project area, due to greater ~~xxx~~ quantity and lower price; minus the loss to competing producers of those goods. (the net gain is figured by the same procedure as that used for the project output itself, as shown in the graph above)

2. Increased productivity of lands in a position to render services to those gaining incomes from the project, e.g. residential land in the project area. Increased productivity of lands in position to process the goods produced by the project.

3. Other sources of extended benefits, as yet undetermined. This is a subject I have not yet thought through to my satisfaction, and I intend to make it my project for the semester.

2. Costs

a. Project Costs

1. Direct payments for resources used in the project.
2. Incidental damages.

a. Where a public facility must be acquired for the project, and also the lands served by it, the value of the facility is reflected in the value of the land, so if the land is purchased the facility need not be purchased separately. Insofar as bonds are outstanding against the lands, land values are reduced, and the value of the facility is not reflected in the land values.

b. Net reductions in rents caused by the project are costs, and should be compensated for, just as increased rents are taxed away. In particular, losses in revenue to local government units should be made good, provided there is no corresponding reduction in costs of local government.

c. Value of displaced facilities is a project cost. This cost has been mentioned earlier (II, B, 1, a, 2, above)

3. Extended Costs

It has been observed that if a project is to claim to

render extended or secondary benefits, account must also be taken of secondary costs. There is an element of truth in this, for some secondary benefits are offset by secondary costs. The essence of project justification, however, is that resources are taken from marginal uses elsewhere and applied to supermarginal uses in the project. They produce more, that is, when used in the project than when used elsewhere. Most secondary benefits spring from this increase of production. Hence secondary benefits will exceed secondary costs. This is a matter for further careful study & formulation.

4. The benefits of alternative projects foregone for this project may be treated as a cost. It is probably easier not to do this, but simply to compare projects directly, on a basis to be developed in section III.

b. Associated Costs

Every net benefit, as discussed in section II, B, 1, implies the existence of "associated costs". There are therefore many categories of associated costs, one corresponding to every kind of net benefit, both direct and extended. I shall not trouble to list them here.

Although formally subsumed in the definitions of net benefits, associated costs are mentioned separately for two reasons:

1. It is of great practical importance to remember that the size of net project benefits depends on how much associated costs project users are ready and willing to lay out. Many projects have failed because project users were unable to undertake associated costs as high as the project planners anticipated.

2. The absolute quantities of benefits and costs, as well as the excess of benefits over costs, is needed to compute the benefit - cost ratio, which is important in selection of projects.

3. Net total benefits.

The sum of all benefits listed, minus the sum of all project costs, is the net total project benefit. ~~xxxxxx~~ (Associated costs should not be subtracted, as they have already been subtracted in figuring benefits net of associated costs)

III. ~~xx~~ Procedure in allocating funds among alternative projects.

(Selection of projects, and scale of projects, are herein determined by one inter-related set of principles)

A. Sum up benefits and costs of all kinds, thenceforward treat them as ~~x~~ totals. I shall refer to these from now on simply as "benefits" and "costs".

B. Tentatively formulate each project to its highest benefit-cost ratio. Then extend each project from this maximum as long as the ratio of marginal benefits to marginal costs exceeds the best alternative benefit-cost ratio obtainable in alternative uses.

Do not extend each project to the point where marginal benefits equal marginal costs, unless the government has unlimited resources at its disposal. There is no justification for using resources in a project where the benefit-cost ratio approaches one, when they

may be used at much higher benefit-cost ratios in other projects.

C. Having tentatively allocated all government resources after the plan in B, we will arrive at a marginal benefits-cost ratio, which will be the lowest benefits-cost ratio which government resources need ever yield. This ratio will henceforward serve as a standard. No project will ever be undertaken whose maximum benefit-cost ratio does not exceed this marginal ratio; and no project will be extended further than the point at which the marginal benefit-cost ratio of the project equals this marginal benefit-cost ratio.

(To simplify the calculation, money marginal costs may be multiplied by this marginal benefit-cost ratio, the multiplicand being the "opportunity cost to the government". This government opportunity cost may be taken as the marginal cost ~~of projects~~ of governmental expenditures, and scale of projects determined using this as the marginal cost curve)

Where priority is an issue, projects with the highest benefit-cost ratios should be undertaken first. Probably, however, the projects may be all undertaken at once. Whenever it is clear that resources may be used in better ways than they have been in the past, they should be diverted to those uses with no delay.

A marginal project, now, will not be one whose maximum benefit-cost ratio is one. Such a project would be submarginal. A marginal project is one whose maximum benefit-cost ratio equals the marginal benefit-cost ratio established by tentatively allocating limited government resources to the uses with the highest benefit-cost ratios first.

D. As long as government resources are limited so that the marginal benefit-cost ratio in government projects exceeds one, effort should be made to increase the resources available to government, until marginal benefits of government projects equal marginal costs.

IV. Repayment

A. Since Benefits exceed costs of projects, it is possible to secure full repayment without injuring anyone. By full taxation of benefits received, it is possible to secure enough resources for the government to carry out projects to the point where marginal benefits equal marginal costs.

B. Prices charged for the salable part of the project output are not primarily a means of repayment, but a rationing device. As such they have two functions:

1, To prevent a demand for project output such that marginal costs exceed marginal benefits. Prices should be no lower than marginal costs.

2, To limit the use of a scarce resource, such as space on a bridge, or water in an irrigation project. The principles that should be used are too complex to sum up in a few words.

C. Landownership is the rationing device thru which most benefits are allocated. Consumer surplus and non-salable benefits mostly accrue to the benefit of local landowners. This is indefensible from the broad public view. (cf. II,A,1,b) Government should therefore collect these benefits thru taxes on land rents. Since benefits will

exceed costs, the project may be paid for in this way and still leave some net benefits to private landowners. This is a good practical test of whether the project actually is economically justified.

This recommendation conforms to the "benefits" theory of taxation and repayment.

D. The "cost allocation" methods of repayment are not recommended.

V. Application to particular kinds of projects

Irrigation, flood control, watershed treatment, navigation, electric power, recreation.

1950

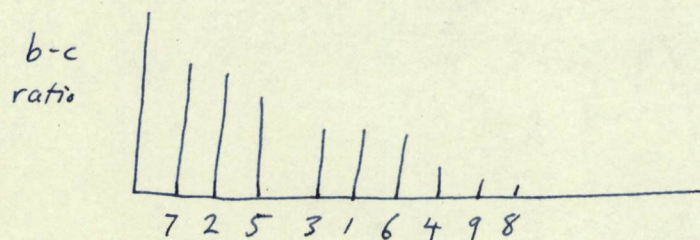
Benefits

Costs (in \$s)

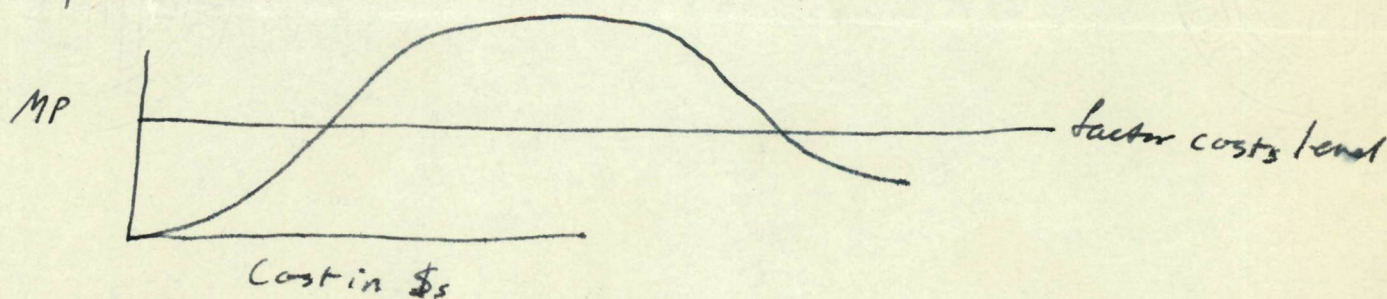
Line at which benefits = costs

The height of curve drawn above is not the mp of a \$ spent so, but the tp as \$ expenditures are Δd . To get benefits per \$, which is most significant item, want 'benefit-cost ratio' - is same thing

For priority, we get a series of b-c ratios



Where each project is extended to max b-c ratio. Then ask, why extend any project further, when alternative uses of costs can get more per \$ expended. But this doesn't make equi-marg. principle clear.



We can't talk just of mp, for we have whole project to evaluate. AP? AP per \$ cost? Same as b-c ratio?

Once we have a project started, equi-marg. principle applies, carry them all out to same level of mp. But this need not be, probably will not be, where $mp = cost$, for govt. doesn't have that much

2

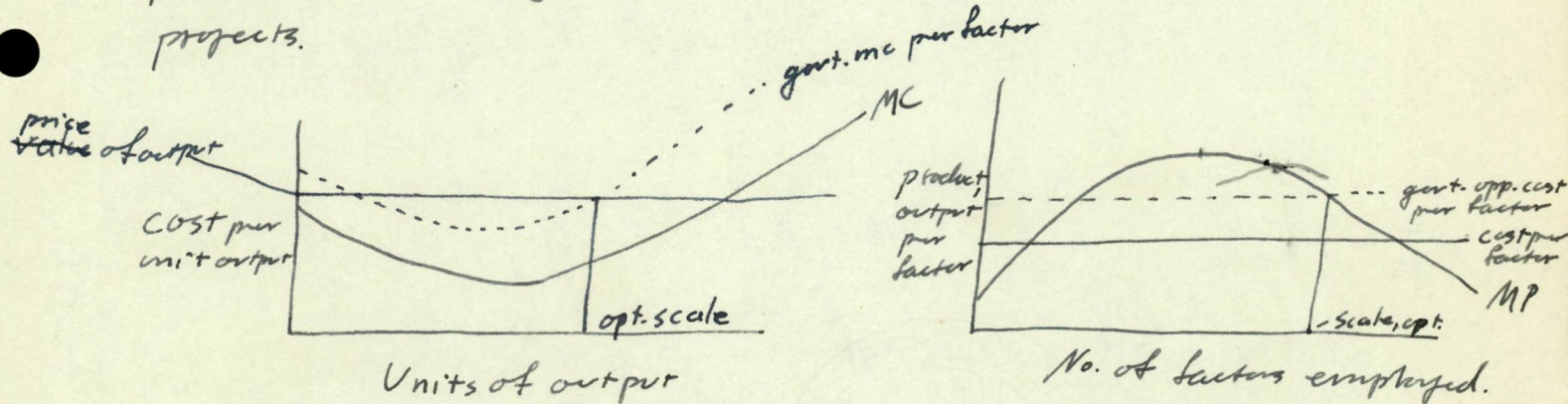
money, & money doesn't automatically flow into govt. projects when $mp > cost$. Cannot justify carrying each or any project out to $mp = cost$, when better alternatives exist.

Whenever m could be spent, in a bloc, at a higher ratio of benefits-costs than obtainable in extending a project, so spend it.

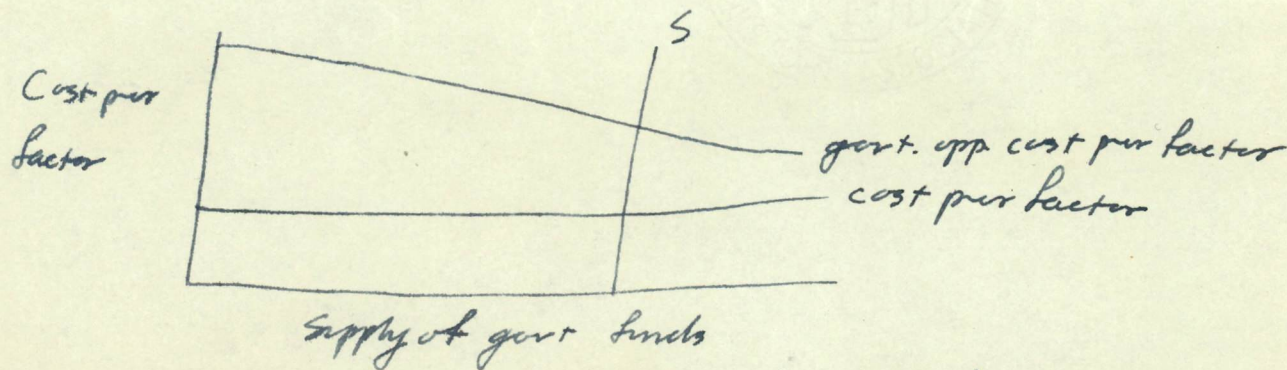
Stop each project where marg. b-c ratio equals the ~~best~~ best alternative b-c ratio in another project. -- which implies that the 'marginal' project will be carried out to pt. where b-c ratio a max, & all others carried a little farther.

May be expressed by introducing "mc", or "mc to govt.", which is straight $mc \times$ ave. or best alternative b-c ratio.

This is just an extension of principle that priority of projects should be by b-c ratio. Not just projects, but parts of projects.



To determine govt. opp. cost per factor:



Curve of govt. opp. cost per factor formed by distributing govt. resources among projects where b-c ratio highest. This involves 2 calculations.

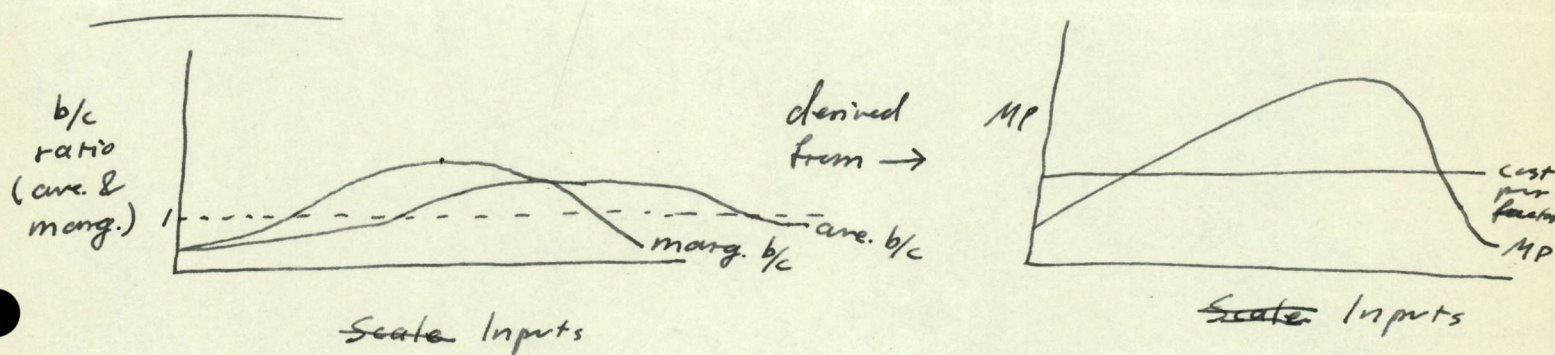
1. Figure max. b/c for each project, & project is worth while if this exceeds ~~the~~ the final marg. b/c ratio arrived at. - or, when first setting it up, exceeds alternative.
2. Extend each project beyond that pt. as long as marg. b/c $>$ standard, or alternatives.

3

When, by this process, you have ~~fitted up all app.~~ you have used up all govt. resources, you reach a marginal b/c, which is standard for all projects thereafter.

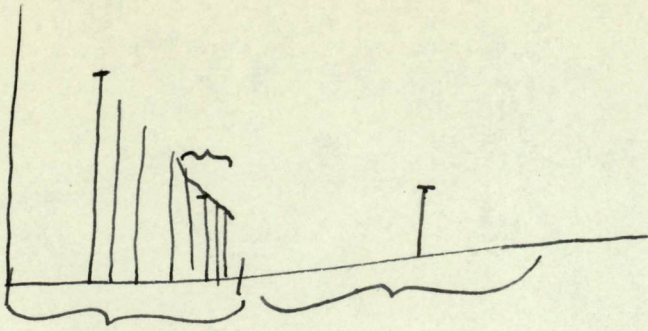
Time sequence then is:

- I. Allocate resources, conceptually, where b/c highest, until all used, as in 182 above.
- II. Strike a marginal b/c ratio there, use no resources at lower ratio.

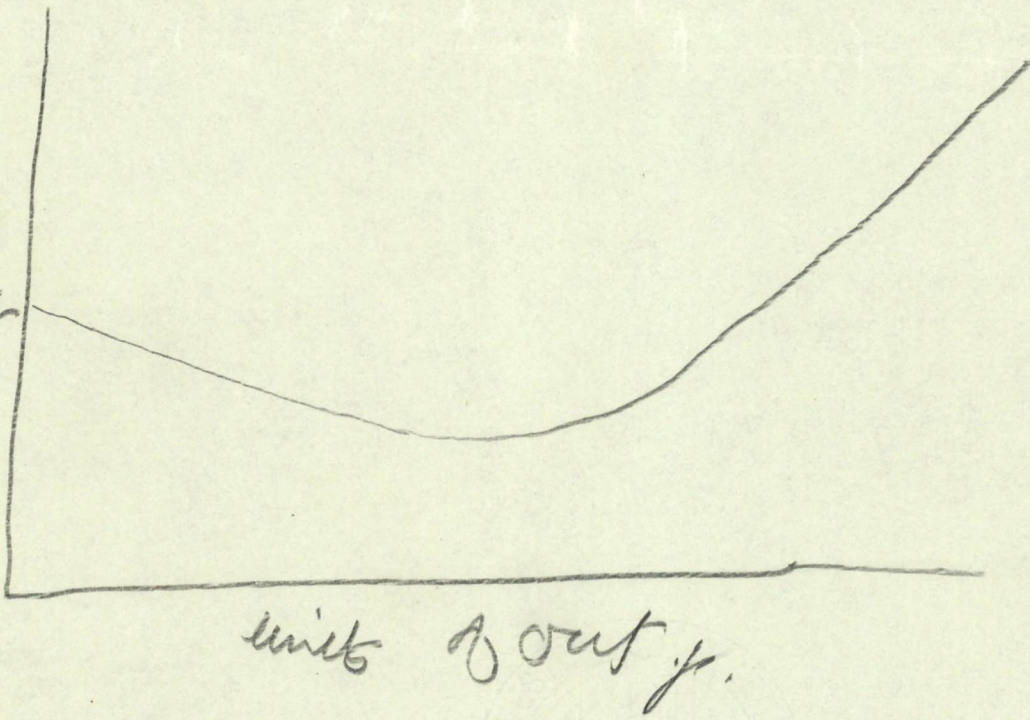


There is never any excuse for stopping short of max. b/c, (ave.)
~~But often is~~ Even when marg. b/c are falling, for you are still
 overcoming original handicap. But when ave. starts to fall,
 may want to stop.

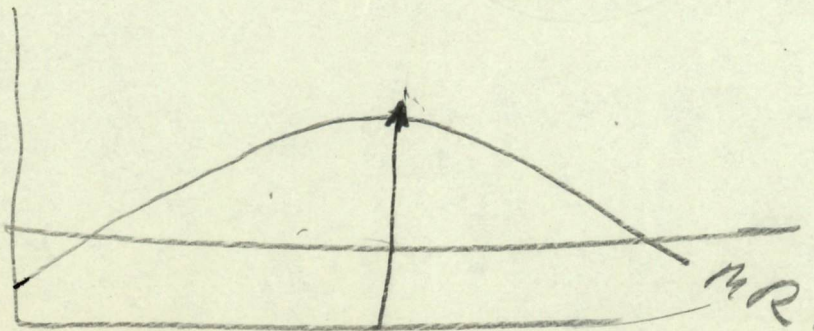
$\frac{b}{c}$



cost/unit



units output



MR

555-

Bon Mot

Vagueness of why, agencies take advantage to serve own ends.

Pass from private to social accounting, hard transition.

Contractual & residual shares.

Develop projects to meet future need for employment
demand " products.

This affects o.c. idea, which is more static.

What to discount? Should future costs be subtracted.

Purposes of Project Analysis

Priority (~~alternative~~)

Scale

Economic justification. - cf. benefits & costs

&

Financial Feasibility - much narrower. Salable benefits, & capital availability. (look out for benefits not turned into cash) Self supporting projects. & projects that wd be feasible if didn't have to start paying so soon.

Choice among alternatives on same site, or same function performing. ... & latter maybe alternatives now, later both nec.

Effect on demand -- sufficiency of demand

Timing

Allocating Costs --- multiple purpose projects esp. difficult.

Importing Incidence of Benefits

Each purpose requires different kind of analysis.

Ben-cost project analysis.

Subjects

1. Priority -- highest b/c, $\frac{B}{C}$
2. Scale --- out to MP = opp. cost of M. Pamphlet wrong, want max B-C.
3. Extended benefits. -- from wheat, mills, bread, etc.
 For compl. factors, ^{"assoc. costs"} another alternative, Arents to them -- i.e. they get more in project than a.c.

Costs.

Risk & int. --- they would make specific risk allowances, then take some 'pure' i.r.

What i.r.? I say consider the i.r. relevant to situation, cost at which agency in question can borrow. But risks of particular project would cause it to be less credit worthy than govt -- risks plus capmkt costs. But take care of these with risk allowances specific.

They want 2 1/2% for project, 4% for assoc. things, private.

Cut off analysis at 100 yrs (but i.r. effectively cuts off before that. -- Rightly? Yes, but why sacrifice present cap for future values when the cap will grow to greater values? Only reason would be in complementarity of particular future goods, to other values depend on them)

Net 2dy benefits are value added in dependent activities, minus costs. -- ~~for~~ mobile factors drawn from mgmt activities elsewhere, applied taperingly here -- to 2dy benefits are resources created land. (Should dist. allocation & aggregate motives for project, & in allocation, not be concerned with aggregates, as all have same agg effect on agg.)

Pamphlet underweights 2dy benefits.

Over for Cost Allocation

$$= \frac{\frac{1}{(1+i)^0} - \frac{1}{(1+i)^{n+1}}}{1 - \frac{1}{1+i}}$$

$$= \frac{1 - \frac{1}{(1+i)^{n+1}}}{i}$$

$$= \frac{1 - \frac{1}{(1+i)^n}}{i}$$

Cost Allocation.

Benefits received vs. Allocated Costs.

Allocating costs tough, have for 'separable costs'. There, use 'sep. costs - remaining benefits' method. 'Remaining benefits' apportioned according to excess of ~~the~~ benefits - separable costs for each. --- i.e., its joint cost allocation problem is handled on benefits received basis.

Ceiling & floor for repayments

Benefits

separable costs

Special Seminar on Indirect Economic Effects of Land and
Water Development and Improvement Projects and Programs.

1. Purposes of cost-benefit analysis (project evaluation.) 1/
 - a. Economics of social justifications for project or program costs (project selection.)
 - b. Project formulations and design. Program planning.
 - c. Determination of the relative desirability of several projects (priority list.)
 - d. Distribution of costs between geographic areas, public and private interests, and among types of beneficiaries.
 - e. Calculation of repayment amounts and schedules.
2. Definition of benefits and costs.
 - a. "Benefits are all effects that result from the increased provision of goods and services that are attributable to a project. In an economic sense, they become the increases in the values attached to goods and services provided as a result of a project." 2/
 - b. "Costs are decreases in the goods and services provided as a result of a project, and in economic terms also take the form of values." 2/
3. Classification of benefits and costs. 3/
 - a. Basic categories.
 - (1) Changes in provision of goods and services.
 - (2) Changes in time of accrual of goods and services.
 - (3) Changes in risk associated with the provision of goods and services.
 - b. Classification on the basis of measurability.
 - (1) Tangible (monetary) costs and benefits.
 - (2) Intangible (nonmonetary) costs and benefits.

1/ Subcommittee on Benefits and Costs. Federal Interagency River Basin Committee. Economics of benefit-cost analysis. Preliminary draft. (Ditto) Washington, D.C. July, 1949. Chap. I, p. 2; Chap. II, p.54; Chap. III, pp. 6 and 7; Chap. IV, p. 1; Chap. V, p. 1.

2/ Ibid Chap. II, p. 26

3/ Ibid. Chap. II, pp. 27 and 28; pp. 60 and 61.

c. Classification on the basis of incidence and immediateness of relations to the project.

(1) Direct (primary) benefits and costs.

- (a) "Private point of view" directness based upon incidence-- direct benefits are increases in goods and services capable of being appropriated by individuals. Direct costs are the payments that must be made in order to secure the use of the required resources.
- (b) "Public point of view" -- remoteness of effects from the primary project purpose becomes the basis for grouping effects into direct and indirect categories and direct benefits therefore (in the absence of a specific definition) may be assumed to be increases in goods and services resulting from the first stage of production of the immediate products of the project.^{4/}

(2) Indirect (secondary, general, extended) benefits and costs.

- (a) "Private viewpoint" -- "those which accrue to others usually in an incidental and unintentional manner."
- (b) "Public point of view" -- probably increases (or decreases) in goods and services, attributable, to the project, resulting from successive stages of processing beyond the primary production of the project.^{4/}

4. Cost justification (social viewpoint) and project formulation and design.

a. Primary requirements. Benefits must be,

- (1) Attributable to the project,
- (2) Net of all costs other than those with which they are being compared. Associated costs (nonproject costs involved in making use of the project facilities) are deducted from benefits.
- (3) Not in excess of the alternative costs of providing the same service.^{5/}

b. Criteria

(1) Total benefits must exceed total costs.

- (a) Benefits include: Aggregate of private direct and indirect benefits based on market valuations; additional social valuations based on extra-market prices and discount rates. "Net benefits can results from project expenditures (for construction) only in certain cases, as, for example, when utilization of unemployed labor or goods and services would

^{4/} Failure of the subcommittee to give definitions corresponding to these assumptions probably was intentional. "Only from the viewpoint of a private enterprise in the market economy is it possible to draw reasonably sharp and significant distinctions between the direct and indirect effect of a particular activity. Ibid., Chap. II, p. 60.

^{5/} Ibid., Chap. II, p. 57 and p. 68.

otherwise have a lower alternative use value." ^{6/}
 Net indirect benefits from project operation may arise if the resources used in processing the product of the project or servicing the increased demand for goods stemming from the project were used more effectively than in an alternative use. "This increased efficiency needs to be sufficient to more than offset any decreases in the efficiency with which other resources are used because of the project." ^{7/}

(b) Costs expressed in terms of an average annual equivalent include: the alternative use-value of the invested resources; allowance for depletion of the resources; goods and services necessary annually for operation and maintenance; reductions in production or services in competing enterprises or areas; removal of previous benefits; increases in production hazards; acceleration of cost accrual and other adverse effects.

(c) Offset effects: "... it is often possible, by eliminating completely offsetting effects from the analysis to avoid the necessity for complete measurement of indirect effects."

(2) Benefits from each separable segment or degree of intensity of development must at least cover the costs of its inclusion.

5. Determination of the relative desirability of several projects (priority list).

a. Purpose: to make possible the selection of those projects which under conditions of limited resources will provide maximum benefits.

b. An array of projects may be made by arranging them in the order of the magnitude of:

(1) Net benefits

(2) Total benefit--cost ratio

(3) Project benefit--cost ratio

(4) Net benefits--installation cost ratio

(5) Rate of return on investment

6. Cost allocation, assessment and repayment.

(This segment would logically require the analysis of incidence. This difficult procedure has not been developed to any satisfactory degree.)

^{6/} Ibid, Chap.II, p. 62.

^{7/} Ibid, Chap. II, p. 63.

Good writing

The Scope of "Land Economics"

Land economics deals with the relations of man to land. It is a separate subject because of the unique characteristics of land: Land was not produced, and is not reproduceable. Land is fixed in space, so that each parcel has unique and permanent relationships with its neighbors, and the use of part and of whole are inevitably inter-related spatially, as well as in the usual economic ways. Land, as space, is expected to last forever. Land, as exhaustible resources, is the original storehouse from which all material wealth is drawn, and to which it ultimately returns. Land is the economic trap which catches in most of the economic benefit from public works and social development. For all these reasons land, while to the individual just another capital asset, is to society something of particular concern. By the nature of land, its utilization is a social as much as an individual problem. Traditional economics stresses the individual viewpoint, Land economics the social.

The particular issues in land economics may be pigeon-holed in any number of ways. The particular categories chosen indicate the focus of interest of the individual or generation that uses them. To list such categories does not add much to our knowledge of the ~~scope of the subject~~ potential scope of land economics, but only tells us what aspects of the subject have attracted interest. This is worth knowing, even if it only reveals, by default, what aspects remain to be studied.

"Land classification" occupies a prominent place in land economics. The mere process of cutting the subject up is not of much interest, but, as many kinds of land resources have peculiar problems, classification leads the way to a series of studies of ~~the unique aspects~~ principles and problems unique to agriculture, forestry, wilderness, ~~mining, water use, city planning and others.~~ mining, water use, city planning and others.

Another distinct aspect of the subject is the theoretical study of economic principles peculiar to land. This study need have no particular end in view save the pure scientific one of creating a body of knowledge, of fact and relationship, to explain what is observed and serve, where desired, in solving practical problems. In this department of land economics I note what seems to me a gross omission, the study of land allocation. It certainly behooves land economists to explain how land is allocated among different uses, and to justify or ~~recommend~~ recommend changes in current practices, as the facts may warrant.

✓ Land economics was ~~born~~ conceived in dissatisfaction with various aspects of land use. It is appropriate, therefore, that much of the attention of land economists has been focussed on particular "problems", i.e. land uses which clash with the ideals of the observer. ✓ Conservation is a perennial. Taxation is another, both to those who think land is taxed too much, and those who think it is taxed too little. The tendency of land to fall into the hands of speculators and absentees has made land tenure a constant "problem". "Land values" rates as a "problem" because of land booms in which values are drummed up beyond all reason; because land assessors have trouble evaluating land; because mortgage credit on land values has been a source of much grief. Land planning is a "problem" because land parcels are uniquely associated with one another and many projects need to be undertaken jointly and in harmony.

Land settlement is a "problem" because settlement experiences have been so universally injured by seemingly remediable ~~xxxxxxxxxx~~ phenomena like lack of planning, speculation, lack of capital, ignorance and dishonesty. "Resettlement" is a "problem" because, rightly or wrongly, society has chosen to subsidize people who insist on remaining on submarginal land, and thereby acquires a right to shuffle them around to reduce the subsidy.

"Agricultural adjustment" is considered by some to be part of land economics. I think it has no place there. To be sure, it often overlaps subjects ~~xxxx~~ such as resettlement and conservation, and it is worth note that the policies benefit agricultural landowners in particular, and agricultural labor little or none. Agricultural adjustment in general, however, is an interference in the price mechanism to bolster the prices of certain kinds of products. It has no unique relationship to land, except to those who think of land as a peculiarly rural commodity.

Availability of credit is a marginal subject. From one view, interest rates are just another price. From another, they are of particular significance in land economics, because of their effect on land allocation. Those without capital or credit cannot buy land.

✓ "Farm management" should not be part of land economics, any more than "business management" should be. To individuals, land is just another piece of capital equipment, albeit with unique characteristics. Only from the social viewpoint is land economics a distinct subject.

Salter, "Land Economics", Ch.s 1-4, Outline and Comment.

Chap. 1, Introduction.

The object of the work to analyze and criticize research in rural land economics, with the thought that the researcher's concept of his problem is more important to his results than any of his tools, and even than the problem itself.

Chap. 2 The Development of Rural Land Economics in the United States.

The history of land economics in the United States is presented. Four major periods are distinguished: the awakening, 1870-1891; the conservation era, 1891-1921; the Postwar re-orientation, 1921-1931; the New Deal Period, 1932-1942.

1870-91 was the era when rapid alienation of the public domain first was questioned. The growth of tenantry, the failure to universalize the "American Dream" of farm ownership, the waste of natural resources, all caused deep concern. Dissatisfaction with national land policies led to the important Revision Act of 1891. Henry George, the Foresters, and insurgent economists following the German inductive and historical viewpoints were leaders in the new movement. *Questioning 'laissez-faire'*

1891-1921 saw much of the public domain set aside for reserves of natural resources. It also saw the beginnings of our policy of providing cheap credit to help small farmers become landowners. In this era Ely's students Taylor, Hibbard and Gray dominated academic land economics. They were primarily concerned with tenantry and conservation. The study of farm management, representative of the English and Austrian interest in individual rather than governmental economic problems, was developed. Warren of Cornell was outstanding. *Return towards laissez faire - but with acceptance of high land values, & tenantry.*

Toward the first World War, land settlement became an issue, and various states developed small land settlement programs, and land economists made relevant studies.

1921-31 was a time of falling farm prices. Land economists loyally became concerned with ways and means of reducing farm production to keep up farm prices. This, according to Salter, was a basic shift in attitude. Cautious expansion replaced the pre-war boomer attitudes, as recommended by the 1923 Report of Pres. Harding's Agricultural Conference, and the 1924 Fact Finder's Report on Irrigation. Retirement of so-called sub-marginal lands was commenced, in New York. Under the auspices of Ely's Institute of Land & Public Utility Economics land planning was sponsored, and rural land planning coordinated with urban planning. Problems of the cutovers and the needed planning were studied. Land tenure and marketing received attention also. The major attention of land economists was devoted to farm management.

1932-42 was a decade of revolution in agricultural policy. We became concerned with increasing prices rather than increasing production. Land economists devoted much of their attention to helping retire "sub-marginal" lands from production, sometimes in the name of land planning, and to administering AAA plans. Zoning and soil conservation measures were studied and administered, but too often with primarily restrictive purposes. Land tenure became of much concern, and, as the government broadened its credit program, land economists studied its effects on land tenure.

Chap. 3, Scientific Method and Social Science

As late as the 1920 decade, aimless gathering of fact and unplanned statistical operations, after the precepts of Karl Pearson, dominated research. Salter is extremely critical of this research method. I think he makes too much of his criticism. I go so far as to suspect that Salter had strong predilections for certain conclusions of research, and was impatient with research that ~~did not lead to the same conclusions~~ was not designed to test those conclusions. He shows inadequate appreciation of the "Baconian myth", as he calls it, that unfettered observation is prerequisite to explanation. Before explanations are attempted, there must be something to explain, and the more different observations of this something have been made before explanation is attempted, the more the facts will influence the explanation, and the less the preconceptions of the observer will influence it. Salter was right, no doubt, that research suffered from the conceptual ineptitude of the researchers, and more research should have been done to test particular hypotheses. He should have stressed the positive part of his thesis, however, rather than the negative. Random observation is useful. If all research followed some master plan, new points of view would be stifled.

✓ The 1938 reorganization of the BAE under Tolley was more to Salter's liking. Research was to follow certain well defined goals, and governmental powers to experiment with conclusions reached were available.

✓ The Greek attitude was that intellectual certainty was established by perfection in organization of concepts. Their skeptical application of this methodology degenerated in transition so that medieval Aristotelians used it dogmatically. In the 17th century Baconian fact collection and Newtonian summarization of natural laws revived science. Salter rates Karl Pearson with these great names, saying his method of probability formulation was the next comparable advance in scientific methodology. Dewey then emphasized experimentation as the criterion of modern science. As one must conceptualize in order to experiment, this gives conceptual thinking a higher place in scientific methodology than Bacon or Pearson allowed it. In the social sciences "experiment" may mean actions that are "deliberate in the scientific sense of being performed with a view to fulfilling an intellectual end ... for the purpose of testing a set of ideas". Galileo presumably applied this method to astronomy, a science which shares with social science the handicap of non-experimentability. This is the method which Salter favors. Also, by implication, Salter feels that social experiments should be conducted by government to test various hypotheses, and that a full research project is only one which contains such a "terminal test".

Salter's positive contribution is to describe and advocate such a scientific method. Interpreting him freely, he is saying that a good research project is comparable to an experiment, if the researcher can find enough historical examples in which the conditions of his hypothesis have been met, or convince the government to set up the conditions. He is unduly dogmatic ~~xx~~ in presenting this as the only way to conduct research, but he is probably right that most research would have been more fruitful if designed to test hypotheses rather than just "Get The Facts".

Unfortunately, Salter's exposition of his positive contribution is very poor. He presents an outline of inquiry consisting of five

sections: statement of the problem; formulation of the problem; hypotheses; processing evidence; and terminal test. The outline itself, stemming from Dewey, is useful enough, once one understands it. Salter's presentation of it, however, is virtually incomprehensible, and, insofar as comprehensible, unconscionably narrow and confining. Salter presents his outline in such ambiguous words and phrases that it is never clear precisely what he has in mind. One gets the impression that he originally intended to confine research to the study of effects of government actions, and later, to broaden the application of his method, replaced concrete with abstract words. He says research is needed when "doubts... arise as to the outcome of an event." What could he mean by "event" except government action? He continues "What means, if instituted, will produce what consequence?" He evidently intends to say "What law, if enforced, will produce a desired consequence?" He has replaced the specific words by the general words to give an impression of generality which his work really lacks. His outline is really intended only to ~~fx~~ guide the study of government action. It can be applied to other research projects, e.g. the search for Newtonian generalities of causation, only by stretching the ambiguities of the outline so far ~~xxxx~~ that all the Salter has been ~~squeezed out~~ stretched out of it.

✓ Salter thinks exclusively in terms of "problem" and "solution", never in terms of "situation" and "explanation", nor of generalizations of relationships. A hypothesis, to Salter, must contain an "if-then" clause: if something is done, certain things may follow. He seems to have no concept of the more usual hypothesis, which is a tentative explanation of relationships. He implies that no research is worth while unless a "problem" exists. But, in fact, we always face the "problem" of trying to improve our condition, and anything is worth studying in the hope that the study may reveal possibilities of improvement. To Salter, a "problem" is something distinct from some assumed normal condition in which all is well.

Salter concludes his chapter with some uninspired comments on various research methods: experimental, historical, case, descriptive, analogical, logical, statistical

Chapter 4: On the Use of Publications as Methodological Evidence

States that he is planning to criticize various research publications, that this is no criticism of their authors, due to the limits placed on them by outside forces.

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The Scope of "Land Economics"

Land economics deals with the relations of man to land. It is a separate subject because of the unique characteristics of land: Land was not produced, and is not reproduceable. Land is fixed in space, so that each parcel has unique and permanent relationships with its neighbors, and the use of part and of whole are inevitably inter-related spatially, as well as in the usual economic ways. Land, as space, is expected to last forever. Land, as exhaustible resources, is the original storehouse from which all material wealth is drawn, and to which it ultimately returns. Land is the economic trap which catches in most of the economic benefit from public works and social development. For all these reasons land, while to the individual just another capital asset, is to society something of particular concern. By the nature of land, its utilization is a social as much as an individual problem. Traditional economics stresses the individual viewpoint, Land economics the social.

The particular issues in land economics may be pigeon-holed in any number of ways. The particular categories chosen indicate the focus of interest of the individual or generation that uses them. To list such categories does not add much to our knowledge of the ~~scope of the subject~~ potential scope of land economics, but only tells us what aspects of the subject have attracted interest. This is worth knowing, even if it only reveals, by default, what aspects remain to be studied.

"Land classification" occupies a prominent place in land economics. The mere process of cutting the subject up is not of much interest, but, as many kinds of land resources have peculiar problems, classification leads the way to a series of studies of ~~the unique aspects~~ principles and problems unique to agriculture, forestry, wilderness, ~~mining, water use, city planning and others.~~ mining, water use, city planning and others.

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Land economics was ~~born~~ conceived in dissatisfaction with various aspects of land use. It is appropriate, therefore, that much of the attention of land economists has been focussed on particular "problems", i.e. land uses which clash with the ideals of the observer. Conservation is a perennial. Taxation is another, both to those who think land is taxed too much, and those who think it is taxed too little. The tendency of land to fall into the hands of speculators and absentees has made land tenure a constant "problem". "Land values" rates as a "problem" because of land booms in which values are drummed up beyond all reason; because land assessors have trouble evaluating land; because mortgage credit on land values has been a source of much grief. Land planning is a "problem" because land parcels are uniquely associated with one another and many projects need to be undertaken jointly and in harmony.

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Undone

Agricultural Economics 207

Questions on Salter, Chapter II.

1. What were the two original fundamental premises of national land policies?
2. How were these premises changed? Who were the pioneers in this change? What was the source of the influence which brought about the change?
3. What was the name of Ely's first course in the field of Land Economics. (This was to have been the name of a book.)
4. Give dates of the Conservation era and the Revision Act. What were the provisions of the latter?
5. What other legislation highlighted the Conservation era?
6. What were the main objectives with respect to land ownership in this period of conservation awakening?
7. Through what persons were the early notions of conservation and land economics extended?
8. Enumerate the major subject matter headings in the field of Land Economics.
9. What was the significance of the report on land utilization in the 1923 Agricultural Yearbook?
10. Enumerate the major activities of the federal and state governments and colleges in the field of Land Economics since World War I. What were the causes of the changes in emphasis?
11. What is the major difference in the trends in the fields of land utilization and of property in land?
12. What was the State and Local Planning Program?

DW

9/27/50.

Salter, Research Method

Criticizes existing research for lack of plan. Undervalues, perhaps, Baconian rambling, but is def. on right track.

The 'problem' concept -- 'harried' viewpoint. Fails to distinguish problem & objective, & project, & more curiosity. Everything must be oriented to action, not establishing facts.

Taylor -- goal of farm ownership

Warren -- farm mgmt -- perhaps including how to manage tenants.

Conservation Movement ^{T.R.} was first move toward restrictivism. 20s, "marketing", retaining submgt land, ~~etc~~ rural zoning, price studies, more restrictive.

— Aristotelian deduction; Baconian - Darwinian induction; Newtonian law formulating; Pearson probability formulas. But also S. stresses purposive guided experimentation -- Galileo. Takes Dewey's method, applies to soc. sci.

Problem situation
Formulate problem for controlled inquiry
Hypotheses
Processing Evidence
Terminal Test

On stat. -- he would subordinate it to a priori reasoning. & stress 'control stat.' which is causal.

In "Research in Landed Property" he criticizes a type of report that I have often seen. They start with very radical statements about how ownership is better than tenancy, and end up with some mild recommendations for changing lease contracts. Without even showing that such changes would do any good, other than conceptually.

✓ A very common criticism: the conclusions do not follow from the data presented, and the data presented do not bear on the conclusions, or on much of anything.

p. 201, a brief & uncomplementary reference to Goldenweiser & Truesdell on farm tenancy points up fact that Salter errs in judging things by how they conform to his own standards, rather than by how they accomplished what they set out to do. In this he was too narrow. He takes the entire Gold. etc report and criticizes one chap. of it on grounds that it made some erroneous simplifying assumptions in showing that there was an agricultural ladder. But this of course was a minor part of the book, which was designed to tell the public what the census of 1920 showed about tenantry. The book took various hypotheses and discussed them, and was excellent. He doesn't do it justice.

(When we study tenancy as a problem, the focus is definitely on the land, not the people. For the solution to tenancy is to make all the owners operators, or the operators owners. But this does not solve the human problem, for there are still rich & poor, and inheritance. This is another matter.)

It should be remembered, too, that in any science a general familiarity with the subject matter is prerequisite, and students in this country were not generally familiar with tenantry. Hypotheses must wait until someone has one. One can indeed criticize that people should have them, but this is a criticism of a whole way of living & thinking, not of methodology.

It is very possible that those who made the reports Salter
✓ criticizes had no hypotheses, and that is why they did not
test them.

Besides, the use of hypothesis can also be abused -- it is all
too easy to turn research into a process of proving hypotheses --
and Salter seems unaware of this danger, not to mention susceptible
to the error himself. The great value of Baconian method is that
it rambles around and by accident picks up new angles on things.
Hypotheses are ok if done skillfully & honestly, but abused
hypotheses -- e.g. imagine a Marxist testing his hypotheses about
capitalism -- are as bad as abused empiricism. The biggest abuse
in empiricism I suppose is having implicit hypotheses which limit
the type of facts collected.

✓ Salter's main criticism of each study is that it had no
very definite purpose, such as testing a hypothesis. This criticism
is both good & bad. Misc. collection of stat., and deriving a
standard bunch of stat. facts about the stat. such as s.d. w/o
that's having any known significance for any problem at hand,
does indeed seem like random, undirected activity, and certainly
such activity can be overdone. Random undirected activity is
all right if it leads to new discoveries, if it is really
fearless in breaking down walls. But if it is simply timid
channeled activity -- and taking s.d.s is that -- it is not
exploratory, even in the random sense. It is truly useless. It
is limited by hypotheses in a negative sense, but not guided by
them in a positive sense. You might say the trouble was not that
there were no hypotheses, but that the hypotheses were all old
and taken for granted, that no new hypotheses were tried, and/or
those that were tried were not very interesting ones, and they
were not tested very well.

✓ Criticize Salter for not organizing his Ch.s 5 & 6 on basis of
types of reports, rather than types of subjects studied. After all,
that is what the key to organization of his report is supposed to
be. He was guilty, in short, of using categories not relevant to
his hypothesis, the very thing he criticized others for.

✓ "The farm management survey" is a stereotype report he mentions,
featuring collection & treatment of various standard data, whether
or not relevant. (even this can be justified to a small degree,
desirability of having a standard set of data for all situations.
For you cannot ever say the data are not relevant to the situation,
but just not relevant to some special problem the researcher has in
mind. But if the researcher is not working on a special problem of
his own, but only intends to collect data that should be helpful
for all problems in the future, then standard data are ok. Salter
might object that the particular data collected are not the best
ones for most purposes, but that would be another matter. So we
can definitely criticize Salter for getting so rapt in his own
viewpoint that he did injustice to others, who had different ends
in view. He might criticize the ends in view; or he might just get
busy and go out and do a project such as he thought good.

I do not see that the conclusions about research reports are
different for the various categories he makes. So why make the
categories?

The significance of Salter is not so much that he says anything new, but he says old things to people who haven't been following good old precepts.

The pattern of research he sets up, as a model to follow, is all right, but shouldn't be taken too seriously. The criticism he gives of the research that has been done is utterly devastating. He heartlessly reveals the blundering incompetence and ineptitude of research work in the field. The lesson that he teaches is not that we would all be better off to follow his outline, as a stereotype, but that we should think when we do research. Maybe, in fact, since many people cannot figure such things out independently, it would be better to make them mold their research into some such form as Salter's. Then we could be sure they had done something significant, at least. If not Salter's exact mold, at least we could make them be able to answer some elementary questions about their research method, their purposes, and how their work helps matters.

✓ I should say also Salter understresses point that many of the "problems" were better handled by conceptual than statistical analysis; that stat. work was limited severely by conceptual limitations of problem. Indeed, there often is no "problem" in the sense that some morbid condition prevails. Or often some condition is called a "problem" without asking whether it is or not. The social assumptions, e.g., on which it is considered a "problem" that some people are failing to succeed financially on submarginal lands, are not discussed.

He might have mentioned that much of the work & its conclusions is biased because it is put out by people looking for jobs, trying to make it look as tho some govt. intervention were necessary.

In the criticisms of individual studies he makes it much clearer what he means by his outline. But his concept of a "problem" is just as ambiguous in illustration as in formal definition. At one point ✓ "the problem" is to "encouraging farming on good land & forestry & recreation on poor land."--p. 133. But this is a solution. The "problem" is the assumption that the market mechanism is inadequate for this -- which it may be -- and this is not even mentioned. Another "problem" is "failure to establish prosperous & permanent farms on cutover land". But no statement of why this is a problem. ✓ Another "problem" was "helping individual settler to determine ways & means of clearing his land..." This is not a problem, but a project. The problem implied here is that settlers are having trouble, the solution to spread information, and this pamphlet is the action taken.

Many studies seem to be just preliminary surveys of the facts -- leaving interpretation to others. The pity is, of course, that after some interpretation has been done, the hypotheses cannot be tested.

A conclusion from Salter, which it is hardly wise to mention to Weeks, is that evidently those in the field are incompetent. This probably simply implies that incompetents have been shunted into this field, due to better opp. elsewhere. And, further, there is little point in reviewing the work of the incompetents at length, for when competent people come into the field they will do good work without having the blunders of their predecessors analyzed in detail.

This is a 2 unit course - must get in some more for Gl?
If so, take 1 hr of 203.

Emphasis today is on regional program development - this the primary survival of New Deal research.

Chap. 3 of Salter condemns much of Denny & Pearson, Weeks thinks good.

PMA vs SCS battle on.
_{reduction, ordering}

During semester, submit a series of brief memos on reading & discussions. No final, these determine grade. Outline with meat. List topics, & describe content & conclusions. Turn in twice, at midpoint & end of sem.

2d 4 chaps Salter, & Sam Eli & W. & Renne.
1st & week: brief memo on scope of field, & on research method in land ec. Then rest of semester on water. Glance at Renne & Eli & Weinman for this.

Sept. 25.

Salter's ch. 2 best on scope of Land Ec. Weeks would have it broader than Salter, on p. 38. 1. Change of use 2. Attaining + more objectives. Procedures, like valuation, are arts, not science. Salter really insists you have an art before you have a science. Salter has condensed & applied Denny neatly. To Pearson, expression of relationships was objective of science. Salter wants progressive correction, testing conclusions.

To W., land ec. is both art & science. He would leave an explanatory field of land ec., for you cannot predict to what use knowledge will be put, be useful for. As an art, is land planning.

Def's of land ec.: "area analysis" is heart of it. Salter one of first to get it.

Revisian Act, 1891, not only stopped disposal of public domain, also started to create forest reserves. Influence of Gms & Ely.
(who were some of those Gms?)

What was rural org. designed, like HOLC, to aid rural land ownership much later than 1916? Rural Credit Adm? (Southwest -) from Tennessee Act, 1937?

Subjects in Land Ec.

1. Land
1. Land Utilization (often carelessly used = 'use', but is fine distinction: ---ion implies higher grade of use. 'Use' may be unec. use.)
2. ~~Natural Resources~~
3. Tenure
4. Valuation - a broader term than 'appraisal'.
5. Taxation (only aspect of foreclosure for non-payment has been studied. On its own merits, neglected)
6. Classification - maybe has not a topic per se says W., just a means to amend.
7. Land Policy - directional measures (or control)
8. Planning

Wicks outline - not dogmatic.

1. Utilization
2. Income
3. Valuation
4. Tenure & policy. (most policies carried out thru tenure)

— Calif. people opposed to counting 'intangible' benefits, Fed. people all for it.

— v. pp 75-6 P, Salter, & ref. in Ante.

— Pearson's method: 1. Facts 2. Classify 3. Relationships
4. Express in statistical formulae. (5. Reliability of formulae)

Between this, & Salter's method, is observation in social science

Weeks, Oct. 2

Ass. For chap. 3 outline, rewrite Salter's outline in language anybody can understand.

Ass.: Ch 182, ^{8, app. 1} Inter-Agency rept. 'Economists & Engineers' like rept. Incl. Army Eng. Opponents mainly those who want to throw in into projects with no question of ec. justification. 'Spenders'.

Write a research plan for further delving into water problems.

Salter: in social science, your 'experiments' are observations of others' actions. - or perhaps on experimenting govt.

You start with hypothesis - conceptual reasoning - apply to test it by facts, correct it (process of self-correction), & return to generals. - i.e., another hyp.

Observing consequences involved. Weeks stresses that word.

Pearson just monkeyed with conjunctive, not sequential, relationships. (i.e. correlation, not cause)

Salter says both induction & deduction occur at once, in his method, use both all the time, back & forth.

Salter's conjunctive relations are correlations. They give clues, but are not end of research. Causal, or sequential relations, the end.

84A
4B, p. 69. cf. bottom of p. 75-6, gives answer.

Weeks will find in this - by deductive reasoning - an approach to intangible benefits. He wants us to read this one, ^{exp. 74-5} & get something extra & important from it, helping study intangible benefits.

See if consequences hypothesized coincide with actual ones. As not, correct, re-hypothesize.

Classical vs. control stat. is Pearson vs. good modern method.

Wants us to work together to make clear statement of something; sequential relation, their place in Salter's procedure.

Impressions of scope of land ec., from Ely & Wetmann.

* 'Land as prop.' - institutional.

"Ec. of land utilization" - rent, capitalization, dim. returns, allocation - all sorts of charts illustrating simple things. Description, elementary. - time element, (ripening, changing use). Actually is some analysis here, some ec. thinking.

Ch. on 'ag. land', 'tenure & conservation', 'and lands utilization', 'forest land', 'recreational land', 'water resources', 'mineral & power', 'urban', 'conserv. & social control'.

Descriptive mainly.

E. H. Wiecking, "Farm RE Values & Farm Income", *Annals of Am. Soc. of Pol. & Econ. Sci.*, March 1938.

Gives formula for land value: $V = \frac{a}{r} + \frac{i}{r^2}$, where i is anticipated annual Δ in rents, & a is current rent. Check, it.

That land lasts forever makes inheritance tied with it. As space, is an asset that cannot be dissipated. But in fact, only as a physical entity is this so. Its ownership can change, just as cap. can be run down.

'Intangible' means incapable of being measured in money. Both benefits & costs. Harder to distinguish ~~from~~ primary & 2dary.

'Individual appropriation' is mark of tangible & primary benefits. 2dary are remote from project. Various distinctions.

Dedur trying to make recreation benefits tangible.

Project 'formulation', project 'justification'. Includes scope, & alternative methods.

Ass. Ch. 3 of inter-agency, & pick up some c.s. from Ch. 1 & 2.

Nelson suspects slum owners are deducting much depreciation from inc. taxes, when house was worth almost 0 to begin with.

Water Res. Pol. Comm. expects to re-write Recl. Act.

→ Question of opp. cost, is it good to use, & how much.

Weeks questions on book: unfinished business in it.

1. Opp. cost use in benefit-cost analysis
2. 2nd order benefits
3. Intangible benefits.

Take one of these, or application of principles to one kind of ~~land treatment~~ project, as research project for semester.

→ Weeks thinks they do not give enough weight to intangibles.

W. concerned about separable costs, for benefits from those things with high separable costs would be assessed 'disproportionately'.

Davis' Outline

I Objectives

Use process
of self-
correction
all the way
thru.

Do all at
once, go
back &
recheck

- a. Justification - social
- b. Formulation - max net benefits
- c. Priority - benefits/cost max
- d. Repayment
- [e. Need - alternative use] - in formulation, says W.

} both at once, over & over.

II. Def.s

III Assumptions

- a. Net monetary benefit
- b. Expanding Economy
- c. Comprehensive Public Viewpoint
- d. Full empl.

IV Measurement

- a. Tangible - intang.
- b. Price level
- c. Int. rate
- d. Analysis period
- e. Level of Ec. Activity

- f. Costs of public facilities
- g. Land acquisition
- h. Taxes
- i. Displaced facilities
- k. Extension of useful life
- l. Consequential damages

Renne's chap. on resource allocation has much in a short compass, relevant to criticizing pamphlet.

Problems to take.

1. Adequacy of "eq. theory" in his ass. of Rll empl, for project analysis. "Expanding ec" ass.
2. Is it possible to apply ^{uniform} general principles to all kinds of projects [WRPC thought good to have competition among agencies for projects provided uniform basis devised.

Ass. Finish Salter, use it to prepare proj. plan on subject of arm choosing.

1. Define immediate benefits.

On land served, because served.

⌘ The excess of benefit over cost is shown as area under demand curve. Consumer surplus. Is this, & not two greater quantities sometimes claimed.

~~Thus~~ Who gets this? Whatever factors are restricted in supply. Especially land and, for simplicity, shall speak as tho others were completely fluid.

Land restricted locally. Labor & cap., to a degree, restricted nationally, & some benefit goes to them, but not locally, is diffused.

Must consider also loss of rents to rival suppliers. Show two supply curve graph.

Land as rationer esp. important re non-salable benefits.

2. Is this end of story? No.

a. Increased production & lower price of good in question, repeat same analysis as for project output.

b. Increased demand for and/or value of complements of thing produced.

c. Increased supply of land available for residential, commercial use.

Why put it this way? Consider other start: people come into new area, demand residential & commercial services, & increase rents. But they move away from somewhere else, this not a net gain.

Get net gains where take resources from margins elsewhere, apply them supermarginally here. Consider commercial services, draw graph of diminishing marg. productivity on new commercial sites, show rent creation.

Another way of looking: consider residential values. If people can ~~live~~ get same residential satisfactions here for less rent, they will work for less money. & a new resource has been created.

The delicate problem: degree to which 2dary benefits are reflected back into primary. If supply of 2dary land or other complement absolutely elastic, all goes into primary. If absolutely inelastic, ~~isxnzknemfzk~~ all goes into 2dary.

Projects for Weeks:

1. (2 day) ^{- & costs of} benefits from projects, their def., cause, measurement.
(+ this would fit in with studying for theory prelim)
(not just 2 day, for first $\Delta I.v.$ is called primary) Main point is that excess of benefits over cost is revealed in $\Delta I.v.$, so abstract becomes

2. Anti-spec. provisions in Recl. Law.

& many ^{concrete, intangible} 'immeasurable' benefits, like life saving also so measured.

3. Repayment for projects.

Write it up in Salter form for next Mon.

Bring in Hotelling, on using project so $mc = price$, for max.

4. ~~Water~~ Means of rationing water among project users. benefits from it.

Add some thoughts on relevance of opp. cost.

5. Finish work on land allocation.

This will be obiter dictum, it goes with idea of a benefit beyond price, a c.s., etc. Du Puit's theorem.

Weeks. Oct. 30

Reads from Renne, p. 182

Wants a non-quantitative eval project, research method.

Read Renne ch. 5 on indirect benefits. Important attempt, but half baked. Most important stuff is before p. 182. Has lots of Chamberlin.

p. 178, Demand for Input, & ff., in to 182, sum up well, read first.

Eastern farmers complain about reclamation, swamped with ag. products. This is relevant to my ~~analysis~~ analysis,

showing loss to former suppliers. & to use of opp. cost concept.

Outline of project on 2dary benefits.

1. The 'problem': in this case is a purpose, to define, explain, & measure "2dary benefits," or benefits beyond value of project output's mkt price.

2. Formulation of problem. (Define.?)

One interp. of laissez faire says nothing justified that cannot pay its way. But are benefits not ~~expressed~~ collectible by ~~the~~ private. So another extreme view says mkt values irrelevant; 'broad social evaluation' nec.

I say values not collectible are still measurable mkt. values.

The first c.s. is expressed in Arents. Give analysis, build & defend theoretical framework. Show how these rents identical with excess of 'primary benefits over assue. costs.' (same for Δ wages)

3. Hypoth.

The ^{net} 2dary benefits result from 1, The primary net Δ production.
2. Bringing Making land previously not suited for some service now suited for it.

Each involves general proposition that Δ factor or Δ prod. gives excess benefit. Some deny. Show why: X

4. Testing.

Dig up evidence, as possible.

Ask does he want outlines of what we have done? read?

See if he turned in grade?

Weeks, Nov. 4

He dislikes Womtrp's def. of conservation, for it ~~implies~~ definitely states reduction of waste is not conservation, but only shifting uses to future - (but I think he might say reducing waste today, which costs something today, & As yields tomorrow, was a shift of uses to future, hence conservation)

Everyone make outline, like Davis's. This is a 'landmark' for grade.

Next time, discuss our project plans.

Definition of field: Utilization (use) of nat. resources.
With emphasis on water use. These are 2 dominant themes.

1. Conservation
2. Speculation
3. Ec. of large public projects.

Weeks, Nov. 26.

Discussion of his article kept in Giamini Library

— Ellis has worked with Weeks on theory of measuring benefits from projects. Is no accord on subject. Big question of what should be subtracted as cost. Those who oppose water resources development think of all sorts of things to deduct make all resources projects seem uneconomical. Big question to Weeks: when should opp. costs be deducted as a cost. I guess Weeks has been ~~at~~ trying to measure costs at less than cost.

People claim 2dary benefits are offset by 2dary costs. Want to stop counting. Weeks showed primary benefits similarly offset by opp. cost, tries to argue this doesn't condemn project.

Weeks tried to get rid of money measure somehow by measuring things in physical terms

1. For repayment he favors benefits received
 2. For ec. ~~for~~ justification he favors opp. cost.
- For benefit-cost analysis. But not for repayment. Perhaps of Chicago is with Weeks.

Bureau of Reclamation counted value of labor employed as a benefit, others as a cost

I'm up next week. Start with saying where benefits appear.
where they stop circulating.

Many benefits are major unsolved problems
in his summer work

Weeks, David, Economy of the different methods of meeting land requirements.

Pretty hard to know what he was saying. Stressed that costs of some were income to others; that the distribution of the benefits & costs, as well as their magnitude, should be considered. that alternative ways of increasing production should be selected such that ratio of benefits to costs is highest.

THE TRADITIONAL THEORY OF LAND UTILIZATION

(Tentative Notes by David Weeks)

At the margins between major nonurban uses of land such as forestry, recreation, crop agriculture or grazing, or subclasses of utilization within these major uses, many technological fields will be involved in the comparison of the relative economy of alternative uses. The field common to all of these uses, however, and to the specific problem at hand is that of economics. The major determinants of land utilization within any area are the judgments, decisions and activities of men in their everyday business and personal pursuits as influenced by their physical, economic and social environment.

Economists, partially through observation and partially through reasoning, have developed through many years of controversy some basic concepts regarding these human activities and their probable general tendency in determining the location of the different lines of production. These basic concepts have been recognized as the general equilibrium theory. An important segment of it deals with the theory of rent and land use margins. This classical economic theory, as modified by contemporary writers recognizes gradations in land quality, combining the natural and economic factors determining the economy of land use in an area in the following principles:

I. Economic Relations of the Area to the Outside World.

The utilization of land in any given location depends in part upon its physical location and natural conditions but includes also its economic relations to the outside world. The principles governing these external factors may be briefly summarized as follows:

- A. Economic goods are derived not alone from land but from the utilization of the various factors of production.
- B. The factors of production in a multitude of forms are combined in different proportions in different parts of the world.

The proportion of any given factor in any given form in any given place at any given time depends upon:

1. its relative abundance,
 2. costs incident to its use in its least productive service,
 3. the value of its net contribution,
 4. the degree to which it may be supplanted by another factor or the same factor in a different form.
- C. A given factor of production will be offered in service so long as the costs incident to its use in its least productive service is covered by the value or price of its net product (when $B_2 = B_3$).
 - D. Assuming mobility of labor, management and capital, prices, wages, rent and interest become the rationing agents in the allocation of resources (including land resources) among their various uses.

- E. But all prices (of factors and of products) are interdependent, that is:
1. Value of a commodity depends upon demand and supply. Supply is affected by costs.
 2. Costs of the products are derived from the prices of the factors.
 3. Prices of the factors are derived in part from the prices of the products.
 4. Prices of these products are derived from their costs and demand.
- F. In this allocation, land, labor and capital will tend to be substituted for each other until the transfer of any one to another use will reduce the value of its service. At this point equilibrium will have become established.
- G. The annual value of capital and/or labor at this point of equilibrium will tend to equal the annual value or rent of the quality and quantity of land for which it may there be substituted.
- H. As land rent becomes thus established through the interaction of external and local factors that type of land utilization that can pay the highest rent for a given site becomes established thereon.

II. Local Factors.

According to the traditional concepts of economic theory the more important local determinants of the land use pattern are location in relation to markets and purchasing centers, land character, and the economic relationships among the different uses. For the moment, demand, personal attributes of the entrepreneur and the state of the ~~costs~~ ^{are} are assumed to be constant.

Cost and income prices, therefore, which are determined by the interaction of external and local factors are also momentarily considered constant. An extension of this principle for each of the above three major local determinants is briefly summarized as follows:

- A. Location in relation to markets and purchasing centers as a determinant of land utilization.

The major location factors are:

1. Difference in costs per unit of land area of marketing the product corresponding to differences in location. This factor (represented by the symbol G ⁱⁿ the algebraic expression given below) is measured by:
 - a. The difference in distance (D) of any two situations, (1) and (2) respectively, from market.
 - b. The transportation rate per unit of product per unit of distance. (Represented by T or T_1 and T_2 , etc., if rates differ for different situations.)

- c. Number of (freight) units (W) of product produced on a unit of land area. (Expressed in the same units as transportation rates. Since productivity of land and intensity is assumed to be the same for all situations this item (W) is strictly an attribute of the product, not of the land. Further refinement is necessary, however, if account is to be taken of an economical increase in intensity as production moves toward the marketing or purchasing centers.)

$G = DTW$ (assuming uniform transportation rates).

$G = W (D_2T_2 - D_1T_1)$ assuming different transportation rates for different situations.

2. Difference in the annual cost of goods purchased for use in production corresponding to difference in distance from purchasing center. This factor (C) is measured by:

- Difference (d) in distances of situations (1) and (2) from their respective purchasing centers. ($d_2 - d_1$)
- The transportation rate (t) per unit of purchased goods used in production. (If rates differ for different situations, t_1, t_2 , etc.)
- Number of units of purchased goods (w) required in production on a unit of land area.

$C = dtw$ (assuming uniform transportation rates on goods purchased for use in production)

$C = w (d_2t_2 - d_1t_1)$ assuming different transportation rates for different situations.

3. Reduction in the annual cost of goods purchased for use in production made possible by on site production of these goods corresponding to difference in distance from purchasing center. This factor (c) is measured by:

- Difference (d) in distance of situations (1) and (2) from their respective purchasing centers ($d_2 - d_1$, assuming the purchasing center to be the same as in 2a above).
- The transportation rate (t) per unit of goods used in production if they were purchased instead of being produced on the site. (If rates differ for different situations, t_1, t_2 , etc.)
- Number of units (s) per unit of land area of goods used in production and produced on the site,

$c = dts$ assuming uniform transportation rates.

$c = s (d_2t_2 - d_1t_1)$ assuming different transportation rates.

4. Difference in the annual labor cost corresponding to differences in location. This factor (L) is measured by:

- a. Difference in wage rates (R) at the different situations under consideration (according to traditional theory they would tend to be equal except for the difference in quality of labor and in costs including perquisites -- board, lodging, housing, etc. Because these tend to be less at the greater distance from market and purchasing centers R, according to traditional theory, would tend to be negative).
- b. Amount of labor (M) used on an acre of land in the production process.

$$L = MR$$

5. Summary of traditional location factors. If (A) be used to denote locational advantage:

$$A = G + C - c - L.$$

In words this algebraic summation of locational advantage states that types of land utilization that tend to be located near a common marketing and purchasing center are those which

- a. are capital intensive,
- b. are labor extensive,
- c. result in products which:
 - (1) are heavy producers (in freight units) per acre,
 - (2) are perishable,
 - (3) require special types of transportation,
 - (4) require frequent trips to market,
 - (5) have a low value per unit of freight.

6. Favorableness of location as a factor tending to product specialization.

The relative favorableness of location with respect to a given land use, in addition to determining the location of that given type of use in relation to market and supply centers, also tends to bring about specialization of given areas in that use.

- B. Land character as a determinant of land utilization. According to traditional theory, land character, through its effect upon land rent and in turn the function of the latter in the orientations of the types and intensities of land utilization is one of the basic determinants of land utilization.

1. Analogy to favorableness of location.

Differences in production costs per unit of area caused by differences in natural conditions are analogous to differences per unit of area due to differences in favorableness of location.

2. Natural conditions as a factor in competition for the use of land.

Assuming other competitive factors to be constant, if two or more uses compete for a given land type that use will occupy the site which will suffer the greatest increase in cost per unit of area (and, therefore, the greatest loss in land rent) if production of it is shifted to another land type.

3. Natural conditions and specialization in land utilization.

Uniformity of natural conditions may permit or even require specialization in land utilization.

- a. Land having uniform natural conditions and a wide range of possible uses may or may not specialize in a given type of utilization.
- b. Land having uniform natural conditions and a narrow range of possible uses or only one possible use will tend toward a high degree of specialization in land use.

4. Natural conditions and diversification.

Diversity in natural conditions is conducive to diversity in land utilization. Although apparently self-evident this diversity caused by natural conditions has a complex relation to diversification brought about by the economies of management.

C. Economic relationships among the different types of use as determinants of the land use pattern. Against the forces of location and of land character the economic relation of one use to another operates as a determinant of the type or combination of types of land utilization within a given area.

1. Land use competition and diminishing returns. According to traditional theory, as one type of land utilization is extended in an area (or under a given management) there is a tendency to diminishing returns. The economic limit to such extension is at the point at which a competing use becomes a "better use," as measured by land rent, of the available remaining land area.
2. The supplementary relationship as a land use determinant. A given type of land utilization resists the competition of another use more effectively the greater the extent to which the land, labor and capital resources associated therewith are utilized. The effectiveness of this relationship in determining land rent and, therefore, land use may be illustrated by cases in which:

- a. labor and capital use is distributed more uniformly throughout the year,
- b. crop rotation (associated with diversified use) makes possible a more complete draught upon the nutrients of the soil at the same time preventing fertility depletion,
- c. multiple use of forest land for timber production, grazing, recreation and water flow regulation may result in greater net benefits per acre compared with returns from a single use.

3. The complimentary relationship as a land use determinant.

The greater the degree to which one use depends for materials of production upon others associated with it (under the same management or in the same general area through the exchange of products) the more rigidly will the area devoted to that use be determined; or, in other words, the more difficult will be its expansion or contraction under other influences. This determinant of land use may be illustrated by cases in which:

- a. the utilization of one portion of an area for hay meadow, another for producing crops for livestock feed and another for pasturing livestock may because of the complimentary interdependence of uses resist change through other influences,
- b. the utilization of one portion of an area for forest the products of which would be used in connection with another use in another part of the area as fuel, fence posts, box shooks, building materials, irrigation structures, etc., thus increasing the economy (and the security against competition) of both uses.

4. The joint product relationship as a land use determinant.

A given type of land utilization resists the competition of another use more effectively the more nearly complete is the use made of the raw materials through diversity of products. The joint product relationship as a land use determinant is illustrated by cases in which:

- a. forest use of a given area produces for market saw timber, telephone poles, fence posts, grape vine stakes, fibre board, insulating material, etc., thus more nearly completely utilizing the raw materials increasing land rent thereby the competitive strength of that use in that area compared with a single use such as extensive grazing.
- b. grazing use of a given area breeds sheep for heavy production of both meat and wool, thus increasing its competitive position against grazing for beef production.

III. Local and External Factors as Joint Determinants.

In the foregoing consideration of local factors demand and supply factors governing cost and income prices were considered as being constant. Prices were, therefore, assumed to be constant. An assumption is now made of growth in demand. Other factors remain as before.

- A. Principle of first choice. As demand for the various products of the land increases, prices tend to become such that in competing for a given area for its production the product having an active demand and having available the more limited area suited to its production will take possession of the area. *Like 'comparative advantage' in international trade.*
- B. Elasticity of supply a determinant of land utilization. The above "principle of first choice" can be expressed in terms of elasticity of supply of a product resulting from a given land use. Assuming similar demand schedules a land use, the product of which has an inelastic supply, will take possession of the areas more favorably adapted to its use to the exclusion of other uses the products of which have relatively more elastic supplies.
- C. Integration of the effects of all determinants. In the competition among uses of land for a given area that type of land utilization which results in a product in active demand and which would suffer the greatest increase in cost, and therefore the greatest loss in land rent, per unit of area if located elsewhere, will gain possession of the site, since it can outbid all competitors in the amount of land rent which it can afford to pay.

Wechs says is new way of expressing principle of comp. advantage.

V. Bull. of Soc. Sci. research council,

scope of research in land ec.

Projects 11812

Seminar in Land Economics

Meeting and Date	Responsibility	Subject
(1) 2-16-51	Booett	Arkansas - White - Red Basin Studies
(2) 3-2-51	Decker	The Significance of Hydroelectric Power in the Development of Land and Water Resources
(3) 3-16-51	Davis <i>2245 Ashby</i>	Financing Agricultural Development
(4) 3-30-51	Barbero	Lessons to be Learned from California Experience in State Land Settlement
(5) 4-13-51	Hajjar	The Multiple Purpose Concept in Water and Land Resource Development
(6) 4-27-51	Bruce	Institutions Needed for Water and Land Resource Development
(7) 5-4-51	Gaffney	Institutions for Water and Land Resource Development
(8) 5-18-51	Snyder	Land Problems and Policies
(9) 6-1-51	Open	Land and Water Policy

UNITED STATES DEPARTMENT OF AGRICULTURE

Office of the Secretary

Post Office Box 61
Tulsa 2, Oklahoma
December 20, 1950

The attached work outline is a revised draft of the one dated November 3, 1950. Revisions were made on the basis of constructive suggestions submitted by interested State and Federal agencies. It is anticipated that the agricultural work will proceed under the various categories as herein set out. Detailed outlines and procedures for each category may be worked out by the group working on that particular category under the leadership of the work group chairman.

It should be kept clearly in mind that the attached outline is for purposes of organizing the work only and that it is not to be considered as a report outline. The work performed under this outline will be reported on in conformance with decisions made by the Arkansas-White-Red Basins Inter-Agency Committee.

John A. Short
USDA Field Representative

Sat. A.M. Call Byron etc.
~~Get car fixed~~
~~Call Jeanie if I can give her ride~~
Do shopping
Order a new Plymouth suburban?
Get Horse Meat schedule, buy at right time

Second Draft
12/20/50

AGRICULTURE'S PART IN THE PLANNING STUDY OF THE ARKANSAS-WHITE-RED BASINS

It is apparent that if the provisions of Public Law 516 - 81st Congress (1950 Flood Control Act) and the President's directive dated May 19, 1950, to the Departments of the Army, the Interior, Agriculture, and Commerce to the Federal Power Commission and to the Federal Security Agency, are to be fulfilled, agricultural agencies of Government have an important responsibility to discharge in connection with the Arkansas-White-Red Basins Inter-Agency planning study which is now under way. Adequate provisions must be made for meeting the needs of agriculture if full development and utilization of the land and water resources of these three great river basins are to be accomplished. It is further apparent that the responsibility of the agricultural agencies can be discharged only through the combined effort of the agencies of the U. S. Department of Agriculture, other Federal Departments and of interested States. These agencies in turn must depend in large measure on the people of the area to establish clearly the needs of agriculture, to determine the best way of meeting those needs, and, most important of all, to ultimately effectuate whatever provisions may be suggested as a way of meeting the needs.

In order for the agricultural agencies to efficiently perform their necessary tasks there must be a general understanding of the objectives to be accomplished and the work to be done. Therefore, a work outline has been prepared so that the agricultural agencies and the members of the Arkansas-White-Red Basins Inter-Agency Committee will have a common understanding of the work to be done. Then there will be a minimum of duplication of effort and there will be an opportunity to see that every appropriate phase of agriculture is adequately taken care of. To facilitate the coordination of the work of agencies within the Department of Agriculture, the Secretary of Agriculture established a USDA Field Committee by memorandum. The Secretary's Field Representative, Mr. John A. Short, U. S. Department of Agriculture, Post Office Box 61, Tulsa 2, Oklahoma, is chairman of the Field Committee and also a member of the Inter-Agency Committee. A list of Members of the Field Committee and the agencies they represent is attached.

The Governor of each state lying wholly or partly within the Arkansas-White-Red Basins has designated an official to represent his state in working with the Inter-Agency Committee. The work of the U. S. Department of Agriculture and the state agricultural agencies will be coordinated through the official state representatives. Arrangements will be made in each state for cooperative work of technical state and Federal personnel.

There will be a report of the Arkansas-White-Red Basins Inter-Agency Committee covering the complete plan for the three basins as arrived at through the comprehensive study. Part I of the report will contain the general features of the complete comprehensive plan. Part II of the report will consist of sections containing details and

supporting data covering various subjects. These sections will cover the following subjects of particular importance to agriculture, in addition to others not listed:

- Agriculture (including soil conservation and forestry)
- Flood control and water flow retardation
- Drainage
- Irrigation
- Hydroelectric power
- Recreation
- Fish and wildlife

Federal agricultural agencies, in cooperation with state agricultural agencies, will have the major responsibility for preparing the section covering agriculture, with additional responsibilities in connection with the preparation of each of the other sections listed above.

The section on agriculture will contain a complete treatment of the subject resulting from the study carried out in accordance with the work outline. It will contain a program for agriculture designed to be accomplished in general over a 20-year period. The program as outlined will be considered a framework within which detailed work can be accomplished in that period of time. The 20-year period will be considered only as a general objective and will not be regarded as a rigid limit within which all phases of the program will be made to conform. Each agricultural measure will be considered from the point of view of the physical and economic factors affecting its rate of application, its relation to other agricultural measures, and its relation to other phases of the AWRB Inter-Agency plan. The period of time will be governed largely by those considerations rather than by any rigid time period assumed for the program as a whole. The agricultural appendix will include estimated costs and quantities of measures and programs to be carried out and also a recommended time schedule of application. The Federal agencies which manage lands will be responsible for defining the problems and recommend programs on lands which they control. This work will be coordinated with recommended programs on other lands.

The waterflow retardation and soil erosion prevention surveys of the U. S. Department of Agriculture within the three basins will be reviewed and adjusted to fit into the AWRB Inter-Agency plan. The large amount of material compiled as a result of the surveys will be utilized to the maximum extent. No field work or investigations will be initiated without first ascertaining that the information is not available as a result of previous investigations. Those independent measures ordinarily recommended by the U. S. Department of Agriculture primarily for waterflow retardation or control, and from which the benefits accrue largely "off site" will be included in the section entitled "Flood Control and Waterflow Retardation." These measures for the most part will consist of small engineering structures and will be coordinated with the larger engineering structures recommended by the Corps of Engineers. An economic evaluation of these structures will be made in accordance with principles to be adopted by the AWRB Inter-Agency Committee.

Those measures ordinarily recommended by the U. S. Department of Agriculture as "land treatment" measures and from which the benefits accrue largely "on site," or to the land on which such measures are placed, will be included in the agricultural section. Benefits from such measures will be indicated

in terms of quantitative physical units, monetary terms, explanatory statements of intangible values, or by a combination of such terms.

The total agricultural needs of the three river basins with respect to the subjects included in the study will be determined quantitatively. Predicted accomplishments (projected on the basis of past experience) under going Federal and State programs will be compiled in like quantitative terms. The recommended program will be formulated and expressed in terms of needs over and above those which will be met by going programs, on the assumption that going programs will be carried out at the predicted rate. An analysis of the accomplishments under going programs will be made to see what modifications or changes are desirable.

Where feasible, data will be compiled and assembled by (1) the three separate major watersheds and (2) the eight separate states (3) (a) private lands, (b) Federally-owned or managed lands; (c) non-Federal publicly-owned or managed lands. It is realized that it is not practicable in all cases to compile data in this manner.

BASIC AGRICULTURAL DATA

Compilation of general statistical data, including preparation of maps, charts, and other information on the following items:

I. Population

- A. Farm
- B. Nonfarm
- C. Density
- D. Trends
- E. Relationship of Basin to US and other areas
- F. Migration
- G. Composition and characteristics

II. Climate

- A. Temperature
- B. Precipitation
- C. Wind
- D. Evaporation
- E. Snowfall

III. Lands (acres)

A. Characteristics by physiographic areas

- 1. Topography
- 2. Soils, land capabilities, geology, erosion, etc.
- 3. Quality

B. Ownership

1. Public - Federal, State, County
2. Private - Individual, corporate (farm and nonfarm)
3. Indian lands under Federal trusteeship
4. Trends

C. Use

1. Agricultural

a. Farm

- (1) Crop - irrigated and nonirrigated
- (2) Grassland - irrigated and nonirrigated
- (3) Forest
- (4) Other

b. Nonfarm

- (1) Grazing
- (2) Forest
- (3) Other

c. Trends - farm and nonfarm

2. Nonagricultural land - including municipal, industrial, highway, railroad, stream channels, etc.

D. Farm characteristics (number, acres, etc.)

1. Economic class
2. Size
3. Type-(including part-time)
4. Value -(including real estate and operating capital)
5. Organization and production

- a. Crops - irrigated and nonirrigated
- b. Livestock
- c. Mechanization and technical developments

6. Income

- a. Crops - irrigated and nonirrigated
- b. Livestock
- c. Other

7. Tenure

8. Employment - including labor force

9. Facilities (including rural electrification and telephone)

E. Development (trends in acres, number of farms, etc.).

1. Irrigation
2. Drainage
3. Clearing
4. Flood protection
5. Restoration of abandoned land
6. Other

F. Institutional arrangements - nature, extent, results

1. Conservancy districts
2. Soil conservation districts (including wind erosion districts)
3. Drainage districts
4. Flood control districts
5. Irrigation districts
6. Grazing districts
7. Credit facilities
8. Marketing and distribution facilities - cooperatives, etc.
9. Rural electrification and telephone
10. Tax structure
11. Rural zoning

CONSERVATION AND IMPROVEMENT OF FARM AND RANGE LANDS

*I. Problems

A. Types of erosion, location, extent, means of controlling erosion.

B. Location and extent of areas of low fertility and mineral deficiencies which can be improved by remedial measures.

C. Soil moisture.
Areas where soil moisture conditions can be improved by remedial practices.

D. Land management.

Conservation and improvement problems which can be corrected by proper management. This includes the consideration of rural domestic and stock water supply, wildlife, rodents, insects, competitive and poisonous plants, plant diseases, fire protection, etc.

*Problems and measures concerning conservation on irrigated and drained lands will be included in this section; irrigation and drainage structures will be included under their respective sections.

II. The Program

- A. Prepare list of measures and reporting units (i.e., acres, etc.)
- B. Estimate quantities of all conservation and improvement practices and measures required to meet the "needs" of the farm and range lands. (Includes measures for cropland, grassland, farm woodland, and non-use areas.)
- C. Estimate quantities of practices and measures that can be installed under going programs during the 20 year installation period.
- D. Determine the "Recommended Program" as the difference between the estimated accomplishments under going programs during the installation period and the total estimated needs.
- E. Estimate the installation cost of the Recommended Program.
- F. Estimate the annual operating and maintenance cost of the Recommended Program.
- G. Make distribution of the estimated costs of the "Recommended Program" between
 1. private individuals
 2. Federal Government (program costs on Federal lands will be set out)
 3. non-Federal public (states, counties, etc.)
- H. Estimate annual cost to Federal Government, non-Federal public, and private individuals of present programs.

It is believed that most of the information necessary to build up the program and estimate its costs is available in the files of the several Federal agencies, Federal departments and states.

III. Evaluation of the Program

- A. Certain benefits, such as increases or maintenance of yields from the program, may be evaluated in terms of physical units. Examples of these benefits should be worked up to illustrate the feasibility of the program.
- B. Other benefits, such as the maintenance or improvement of living standards, and land tenure, etc., should be adequately described.

FORESTRY

I. Describe forest resource - its extent, significance, ownership and condition.

II. Present forest resource - development programs.

- A. National forests
- B. Other Federal lands
- C. State and local governments
- D. Private land (public programs only)
- E. All lands - research

III. Forest Problems (Discuss by types of ownership)

- A. Management (including reforestation and harvesting practices)
- B. Fire protection
- C. Insects and diseases
- D. Grazing
- E. Erosion and water management
- F. Credit
- G. Recreation
- H. Fish and wildlife

IV. Forest Program

Present recommended program for (a) National forests, (b) other Federal lands, (c) lands recommended for public acquisition, (d) state and local government, (e) private lands and (f) total for all land, giving brief explanation and showing in tabular form the Federal and non-Federal costs (installation and annual operation-maintenance) for the following measures: (Allowance will be made for accomplishments of going programs)

A. Capital Improvement Measures.

- 1. Timber resource - describe each item, and give volume of work, unit costs, etc.

- a. Forest planting (excluding shelterbelts and windbreaks)
- b. Nurseries
- c. Timber stand improvement

2. Forest range resource

- a. Range revegetation
- b. Fences, corrals, and other stock-handling facilities
- c. Stock-watering facilities
- d. Stock driveways

3. Fish and wildlife resources

- a. Habitat improvement
- b. Stream and lake improvement

4. Recreational resources

- a. Camp and picnic development
- b. Major sanitation and water systems
- c. Other structures
- d. Winter sports areas

5. Water resource

- a. Dams, reservoirs and ponds (other than for flood control purposes)
- b. Stream pollution control
- c. Measures for improving water quality and yield

6. Land rehabilitation for special uses on national forests

7. Administrative, protective, and other improvements

- a. Fire control improvements
- b. Transportation system
 - Forest development roads and trails
 - Landing fields
- c. Communication systems
- d. Structural improvements
- e. Signs and facilities

8. Other protective measures

- a. Special erosion control plantings (other than for reduction of sedimentation)
- b. Insect, disease and poisonous plant control
- c. Rodent and predator control

9. Additional measures for runoff and waterflow retardation.
(See section on runoff and waterflow retardation)

B. Implementing measures (acquisition, credit, technical assistance, education, intensified management, etc.)

C. Forest and range research and investigations. (See section on research)

D. Operation and maintenance

E. Evaluation of measures

Information will be assembled in cooperation with all appropriate private, state and Federal organizations. Data will be obtained insofar as possible from existing compilations and reports.

RUNOFF AND WATERFLOW RETARDATION
(Including sediment control and water yield)

Survey Status and General Procedure

Arkansas River Watershed

Lower Arkansas - area below Tulsa	Report submitted to Washington
Grand (Neosho)	" " "
Upper Arkansas - area between Tulsa	
and Pueblo - Survey approximately	
60% complete	Survey to be completed Sept.1,1951
Fountain Creek	Report submitted to Washington
Arkansas above Pueblo	Survey not started (finish by
	September 1,1951)

White River Watershed

Upper White	Report submitted to Washington
Lower White	Survey to be completed Sept.1, 1951

Red River Watershed

Washita - authorized in 1944	Operations in progress
Red (including review of Washita)	Survey approximately 65% complete--
	To be completed July 1, 1951
Ouachita	Survey to be completed July 1, 1951

When completed, the above surveys will constitute complete coverage of the Arkansas-White-Red Basins. The data obtained in the surveys will be assembled and indexed for ready reference and for incorporation into the Comprehensive Plan. No separate flood control survey reports are contemplated on any portion of the Basin except those essentially completed on the Grand (Neosho), Upper White, Fountain Creek and the Lower Arkansas.

Outline of Major Phases of Work

I. Floodwater, sediment, land and indirect damages.

- A. Unify nomenclature and definitions
- B. Unify price and interest levels
- C. Unify basic assumptions and estimates when practicable and feasible. Note all exceptions.
- D. Summarize estimates of damages for the Arkansas, White and Red Basins.

II. Program for Runoff and Waterflow Retardation and Sediment Control

A. Land treatment 1/ and Independent Measures

1/ Data on land treatment measures will be used in the development of other sections of this work outline.

1. Unify nomenclature and units of measures
2. Correlate recommendations by states and watersheds
3. Correlate price levels and costs both as to year and by states and watersheds.
4. Correlate distribution of costs (Federal, public and private) by states and watersheds.
5. Additional investigations

a. Investigate in cooperation with other departments the possibilities of small multiple-purpose projects, such as flood control and irrigation, flood control and water supply.

6. Inter-coordination of runoff and water flow retardation and sediment control measures with flood control measures investigated by other Departments.

7. Summarize the amounts and costs of measures by states and watersheds (include both going and accelerated, intensified and modified portions of the land treatment measures).

B. Investigate need for additional studies to aid in designing structures and to test effectiveness of recommended program.

1. Establishment of rainfall and stream gages - kind, quantity, cost.
2. Establishment of erosion and sedimentation survey measuring stations - kind, quantity and cost.

III. Benefits of the Recommended Program (benefits from reduction of flood-water, sediment, land and indirect damages; benefits from intensified use of flood plain lands).

- A. Unify nomenclature and definitions
- B. Unify basic assumptions and estimates where practicable and feasible. Note all exceptions.
- C. Summarize estimates of benefits for the Arkansas, White and Red Basins.
- D. Compare benefits and costs.

IV. Effect of Program on Water Yield.

A. Evaluate the effects of the complete program (all land treatment and independent measures) on water yields at selected points where competitive uses of water are important. This phase of the work will require coordination and cooperation with other Departments and agencies. It will include:

1. Selection of points at which estimates are desired and feasible.
2. Estimates of present water yields.
3. Estimates of future water yields with program established.

DRAINAGE

This task will consist primarily of assembling and tabulating available information. Some field work may be required in certain areas where the Department of Agriculture and other Departments will need to correlate their activities.

I. Drainage Problems

- A. Determine the location and extent of the farm drainage problems.
- B. Determine the causes of poor drainage conditions and the general extent of each condition.

- 1. Undeveloped natural drains
- 2. Lack of adequate drainage systems
- 3. Inadequate maintenance of drainage systems
- 4. Unsatisfactory soil characteristics
- 5. Clogging of natural and artificial drains as a result of vegetative growth
- 6. Blocking or constriction of natural and artificial drains by such structures as culverts, bridges, levees, diversion dams, road and railroad fills and irrigation canals.
- 7. Reduced effectiveness of major streams as drainage outlets because of sedimentation
- 8. Problems connected with irrigation

II. Inventory of Existing Drainage Activities

- A. Determine the amount of land on which farm drainage systems have been established.
- B. Determine the status and current activities of drainage districts, Federal, state, and local groups. This will be done in cooperation with Federal and state agencies.

III. The Program (Allowances will be made for accomplishments of going programs.)

- A. Determine the areas feasible for drainage on basis of physical characteristics. This will be done in cooperation with Federal and state agencies, and includes consideration of major drainage outlets where applicable, wildlife values, etc.
- B. Determine the types, amounts and costs of drainage improvements. (Include rehabilitation and new construction of drainage systems). This phase of work will be correlated with work of other Departments.
- C. Determine the economic feasibility of drainage improvements.
- D. Determine types and costs of assistance to drainage districts, soil conservation districts, organized groups and farmers in solving their drainage problems.

IRRIGATION

Irrigation can play an important role in improving the agricultural economy of many parts of the Arkansas-White-Red River Basins. Such an improved economy, however, depends upon the selection of lands suitable for irrigation, recognition of the numerous problems now existing or likely to arise which influence the success of an irrigation agriculture, and of a research and education program which will help farmers to achieve the integration of future irrigation developments into the existing agricultural economy.

I. Problems

A. New irrigation

1. Selection and evaluation of lands suitable for irrigation where water is available
2. Adequacy of technical information on soils, water, geology, etc.
3. Type and size of farm and irrigation systems
4. Credit facilities
5. Community facilities
6. Research and education

B Existing irrigation enterprises, and individual systems.

- 1 Engineering problems
2. Agronomic problems
3. Financial problems
4. Management problems
5. Sediment problems

II. Inventory of Existing Irrigation

- A. Acreage of land under irrigation, according to type, organization, crops grown, etc.
- B. Acreage of irrigated land requiring rehabilitation of irrigation systems
- C. Existing facilities for service to irrigation farmers

III. The Program (Allowances will be made for accomplishments of going programs.)

A. New irrigation

1. Select lands agronomically and economically suitable for long continued irrigation. It should be emphasized that this study shall be supplemental and additional to Bureau of Reclamation investigations and is not intended to duplicate nor supplant Bureau of Reclamation investigations.

2. Assist the Bureau of Reclamation to appraise prospective irrigation projects. This assistance may involve the review of existing irrigation land classifications and cooperation in making additional land classifications as required.
3. Determine types, amounts, costs and feasibility of private irrigation systems.
4. Determine types and costs of assistance to farmers on their irrigation systems.
5. Research for planning and supporting expanded irrigation program. (See section on research.)

B. Lands already being irrigated

1. Determine and analyze the kinds of problems affecting irrigation in different parts of the Basins.
2. Recommend measures to effect rehabilitation of irrigation systems and damaged lands, and estimate costs of rehabilitation.
3. Determine types and costs of assistance to farmers on their irrigation systems.
4. Research to assist in solution of problems. (See section on research.)

RURAL ELECTRIFICATION

I. Rural Electrification

- A. General inventory of rural electrification resources of AWR Basins.
 1. Table of farms without electric service
 2. Table of status of rural electrification of REA borrowers
 3. Maps of rural electric distribution systems on both a state basis and river basin basis
 4. Table of status of rural electrification other than REA borrowers
- B. Need for improvement and expansion of present rural electric systems
 1. Farm needs
 2. Agricultural industrial needs
 3. KWH required to meet these needs
 4. Adequacy of present systems
 5. Rates
- C. Measures required to achieve needed development
 1. Extension of lines to achieve area coverage
 2. System improvements
 3. Amount of additional power needed
 4. Additional sources of power

The above to involve the following activity on the part of REA:

1. Assist FPC and Inter-Agency Committee in power market studies and prepare a consolidated power load estimate of REA borrowers to be integrated with overall power requirements data of basins.
2. Assemble information for preparation of base maps of existing rural distribution systems. These to be used as a basis for planning area coverage of both distribution and transmission.

II. Power

A. General inventory of rural power needs of basins

1. Present power resources (farm and agricultural industry)
2. Present power consumption (farm and agricultural industry)
3. Estimates of power needs for both agriculture and related industries 10 and 20 years ahead

B. Improvement and expansion necessary to meet rural needs

1. Power generation
2. Transmission systems

C. Measures required to achieve development

1. Improvement and enlargement of existing generation facilities
2. Improvement and enlargement of existing transmission facilities
3. New power plants needed and locations

REA's part in power work will involve the following activity:

1. Liaison with committees of Inter-Agency Committee in behalf of correlating REA borrowers' interests with plans for power development being prepared by other agencies, including FPC, SPA and Army.
2. Assist in power market studies by FPC and others of Agriculture and agricultural industry to be integrated with overall power requirements data for the basins area.
3. Correlate REA loan program with power and transmission development being planned by other agencies including Army Engineers, Interior, and FPC.
4. Assist in work of securing and preparation of maps required in connection with the power studies.

III. Rural Telephone

- A. General inventory of rural telephone resources in AWR Basins area
- B. Telephone needs and problems in rural areas of AWR Basins area.
- C. Measures required to achieve needed rural telephone improvement in area.

RESEARCH

Research and investigational work are needed to lay a sound foundation for the planning and development of a long-term agricultural program for the AWR River Basins. Such a program will be carried out in close cooperation with the State Experiment Stations and other agencies of the Federal Government. To insure that there is no duplication of research already underway by any state or Federal agency, an inventory of such work will be made. Also, allowances will be made for accomplishments of going programs.

The research and investigational recommendations proposed here are designed to give guidance to the application of measures proposed to be applied within the Basins and to insure their most efficient and beneficial installation. Under this criterion, research to ascertain the feasibility of irrigating or draining particular lands are included as eventually will research to ascertain the most productive crops and practices used on areas proposed to be drained or irrigated. Research which has value irrespective of river basin boundaries is generally excluded regardless of how it might indirectly improve agriculture or incomes within the Basins. Research of this kind, not specifically designed to help carry out a particular program or development for the AWR Basins had better be planned and implemented under the National Agricultural Research programs now underway in cooperation with the State Agricultural Experiment Stations.

The needs for and costs of the following types of research will be investigated:

I. Soil Surveys and Land Classification.

In planning an orderly accelerated survey program, the following steps are visualized:

A. Preparation of inventory of existing soil surveys and land classification coverage.

This inventory will show the acreage covered by published and unpublished soil surveys, together with an appraisal of their adequacy for foreseeable future needs. The preparation of this inventory requires the cooperative review of existing surveys by representatives of Federal and state mapping agencies.

B. Determination of the kinds of soil surveys and land classification required to meet the needs of an expanded Basins program.

Not all areas of the Basins will require surveys of equal degree of detail. For example, mountainous and hilly lands whose use is largely limited to forestry, grazing, wildlife propagation, and recreation need not be surveyed in as great detail as lands proposed for irrigation development. Investigation of the different kinds of survey needs and recommendations for different types of surveys should be made.

C. Estimation of the future progress of soil surveys under existing Federal and state programs.

This estimate will probably be arrived at largely by extrapolation of the 1949-50 rate of progress, but account must be taken of any foreseeable changes in rate of mapping progress in different states within the Basins. Cooperative studies by representatives of State and Federal mapping agencies will be required.

D. Estimation of the needs for different types of soil surveys and land classification during the course of planning and development.

Cooperative studies by representatives of state and Federal agencies to delineate and estimate areas of each type of survey required.

E. Estimation of the cost of completing the soil survey and land classification of the Basins.

Using the acreage estimates arrived at in section D above, taking into account the existing rate of progress of surveys treated in section C, the cost of the expanded basin-wide program can be calculated.

II. Conservation and Management of Farm and Range Lands.

It is proposed that the needs for research be investigated on the following aspects:

A. Management and conservation of soil and water.

B. Improved legume and grass seed.

C. Grassland management and forage utilization including determination of the recovery potential of depleted range lands under semi-arid conditions.

D. Economic research.

E. Riparian vegetation.

III. Reduction of Water Runoff and Sediment.

A. Test the effect of land treatment and structural programs on water runoff, flood flow, and groundwater storage.

B. Test the effect of land treatment on sediment production and deposition.

IV. Irrigation.

- A. Consideration of soils and geology.
- B. Consideration of water quantity and quality.
- C. Consideration of crop adaptation.
- D. Consideration of economic factors.

V. Forestry

- A. Watershed management.
- B. Forest management.
- C. Range management.
- D. Fire control.
- E. Use of forest products.
- F. Forest economics.
- G. Forest insects and diseases.
- H. Shelterbelt establishment and maintenance.
- I. Resource inventories and surveys.
- J. Forest recreation and wildlife management investigations.

VI. Drainage.

- A. Types of drainage best adapted to different soil, climatic, topographic and geologic conditions.
- B. Depths and spacings of tile drains, mole drains, and ditches.
- C. Relationships among soils, crops, management practices, and tile materials and the longevity and effectiveness of tile-drainage and mole-drainage systems.
- D. Controlling deterioration of natural and artificial drains caused by unwanted vegetative growth.

VII. Economics.

- A. Reclamation and development of new land.
- B. Soil conservation and flood control.
- C. Institutional arrangements and their influence on resource utilization.

- D. Effects of inundations and acquisition of private land for public purposes.
- E. Development of basic current agricultural statistics for the Basins and appropriate sub-areas.
- F. Appraisal of benefits and costs of proposed structures, measures, and practices included in the comprehensive Basins plan.

It is expected that this would be a continuing research activity.

- G. Economic effects on agriculture of increased industrial development arising out of implementation of the comprehensive Basins plan.

EDUCATION

I. Problems.

- A. General lack of public understanding of development proposals, including relationships between upstream and downstream water use, development and control.
- B. Lack of appreciation of possibilities for increased income, more stable economy, and improved living standards.
- C. Incomplete cooperation and participation of farm groups, civic and commercial organizations, and local, county and state institutions in the planning for and development of measures to most fully utilize the resources of the Basins.

II. Education Needs.

- A. Development and expansion of participation of farm and civic leaders working with representatives of all agencies in planning the development of the Basins.
- B. Development of understanding between upstream and downstream users of water.
- C. Assistance to farmers, ranchers, and forest and woodland users in understanding and adopting a wide range of new techniques of soil, forest, and water conservation and management.
- D. Assistance to farm people in achieving better living standards and farm efficiencies.

III. Program.

- A. Evaluate the present educational program, and determine additional educational requirements with respect to the following aspects.
 - 1. Conservation in general farming and range areas.
 - 2. Forest resources.

3. Irrigation.
4. Drainage.
5. Rural electrification, and rural telephones.
6. Supporting programs.
 - a. Research.
 - b. Credit.
7. Assisting people to realize better living standards and farm efficiencies.

IV. Evaluation of program (including analysis of going programs.)

AGRICULTURAL CREDIT

Investigation of special credit needs of groups and individual farmers in Basin areas generally will follow in the wake of concrete development plans and can be based largely on current experience records of existing credit agencies together with available census and economic data. Preliminary planning, however, should take into account the support soundly-applied credit can give in expanding, speeding up, and spreading equitably the benefits of area or project programs. It is proposed to determine the needs and costs for providing credit for:

- I. Farm acquisition, - to support farmer purchases and development of new farms to be created by irrigation, drainage, clearing or other similar measures. Certain undersized units will need to be brought to economic size by additional land purchases.
- II. Farm improvement, - through loans to both present and new operators to support complete land development measures on the individual units, including land leveling, drainage, soil treatment, water retardation, farm organization, and farmstead arrangement.
- III. Farm operations, - "Adjustment" credit in areas where major development or adjustment programs are calculated to make desirable complete or partial conversions in type of farming. Credit can implement these shifts which may affect both the place and mode of living and operating, and may help to balance the operations of most farmers in light of new opportunities or forced changes.
- IV. Water facilities, - for irrigation facilities and installations, either community projects or individual systems, and for development of safe, dependable farmstead water supplies and pressure distribution systems.
- V. Farm housing, - to finance improvements to farm structures, new structures, to provide for "decent, safe and sanitary" living, and operating conditions and general efficient farm management.
- VI. Rural electrification, - for rural electric distribution, generation, and transmission facilities, farm installation, and consumer equipment.
- VII. Soil and water conservation facilities, - for purchase and use by individuals, organized groups, such as conservation district groups,

of special heavy equipment to provide for rapid and efficient attainment of planned land treatment programs.

VIII. Marketing and processing facilities, -- for cooperatively-owned and operated facilities to take the expanded or specialized production in new irrigated areas and provide for group purchases of special farm supplies.

IX. Establishment and operation of sustained forest production enterprises.

Certain credit aspects may need to be considered in connection with studies on the following points:

- I. Changes in land use, size, type and organization of farm units.
- II. Ownership and tenancy patterns.
- III. Farm income levels and distribution.
- IV. Inundation of farm lands.
- V. Displacement of farm families from local lands.
- VI. Appraisal of ability of farmers to pay or repay development costs.
- VII. Expected increase in farm production from resource development plans.

It is recommended that area studies of agricultural credit needs be coordinated with project or area development planning when such planning has progressed to the point of defining area bounds, the total number of families involved, and the principal changes or improvements to be accomplished. Earlier credit consideration can be confined to recognition of the general gains to come from suitable development credit to support each type of planned improvement. An analysis of existing credit programs will be made.

APPRAISAL OF AGRICULTURAL ASPECTS OF RESOURCE DEVELOPMENT PLANS.

General economic investigation and appraisal will be made of the effects of resource development plans as they affect the agricultural economy of the Basins and the U. S. as a whole.

- I. Prepare tentative estimates of expected agricultural production from resource development plans and appraise their effects on the agricultural economy:
 - A. Food and fiber needs.
 - B. Income levels and distribution.
 - C. Agricultural prices of various products.
 - D. Cost-price ratios of different products.
 - E. Number, size, type and organization of farms.
 - F. Ownership and tenancy.
 - G. Forest products.
 - H. Special investigations as required for other factors.
- II. Compilation of data and investigations to determine economic effects of land development:

- A. In cooperation with other agencies, prepare a comprehensive inventory of existing and potential new land development possibilities including:
 1. Irrigation.
 2. Drainage.
 3. Clearing.
 4. Flood protection.
 - B. Make appraisal of the analyses of potential new land development in terms of effects on agriculture, including:
 1. Irrigation.
 2. Drainage.
 3. Clearing.
 4. Flood protection.
 - C. Make a tentative determination of the sizes and types of farms most likely to succeed in areas of new land development.
 - D. Appraise the ability of farmers to repay development charges - especially for irrigation.
- III. Investigations to determine the problems arising as a result of construction and operation of flood control, irrigation, and drainage projects as they relate to:
- A. Inundation of farm, range and forest land.
 - B. Displacement of people from local areas.
 - C. Production changes.
 - D. Changes in land use, farm organization, sizes and types of farms.
 - E. Costs borne by farmers displaced - moving, breakup of established farm patterns.
 - F. Impacts on local governments and community facilities.
 - G. Reorganization of school districts.
 - H. Changes in tax base.
 - I. Management of public land.

IV.. Overall evaluation of agricultural program.

ORGANIZATION AND PROCEDURE FOR WORK.

In order to effectively accomplish the work in agriculture and to insure coordination of that work, the following organization and procedure is proposed:

The work of the U. S. Department of Agriculture will be done in regional and state offices of the respective agencies to the maximum extent possible. There has been established in Tulsa a small coordinating group of U.S.D.A. personnel which consists mainly of members of the U.S.D.A. Field Committee. This group serves in an advisory capacity to the Secretary's representative on the A.W.R. Basins Inter-Agency Committee, as a coordinating group on the agricultural work, and individually as work leaders on various aspects of the work.

The states are invited to coordinate their agricultural work in connection with the A.W.R. study by assigning such technical personnel as they may wish to work with U.S.D.A. technical personnel on various aspects of the study. Likewise, Federal members of the A.W.R. Basins Inter-Agency Committee are invited to make similar arrangements.

Work leaders or chairmen have been designated for various phases of the work. These leaders will be responsible for coordinating the work of various agencies of the U. S. Department of Agriculture. They will also assist the Secretary's representative in coordinating this work with the work of the states and Federal Departments. For the most part, these chairmen consist of members of the U.S.D.A. Field Committee.

Following is a list of the work categories and the Departmental agency participation in each category.

Conservation and Improvement of Farm and Range Lands.

Production and Marketing Administration

Soil Conservation Service

Forest Service

Extension Service

Bureau of Agricultural Economics

Agricultural Research Administration

States and other Federal Departments.

Forestry

Forest Service

Soil Conservation Service

Bureau of Agricultural Economics

States and other Federal Departments

Runoff and Waterflow Retardation

Soil Conservation Service

Forest Service

Bureau of Agricultural Economics

States and other Federal Departments

Drainage

Soil Conservation Service

Production and Marketing Administration

Agricultural Research Administration

States and other Federal Departments

Irrigation

Soil Conservation Service

Production and Marketing Administration

Agricultural Research Administration

Farmers Home Administration

States and other Federal Departments

Rural Electrification

Rural Electrification Administration

States and other Federal Departments

Agricultural Research

Agricultural Research Administration

Forest Service

Soil Conservation Service

Production and Marketing Administration

Bureau of Agricultural Economics

Extension Service

Rural Electrification Administration

States and other Federal Departments

Agricultural Education

Extension Service

All U.S.D.A. agencies

States and other Federal Departments.

Agricultural Credit

Farmers Home Administration

Farm Credit Administration

Other agencies of the U.S.D.A.

States and other Federal Departments

Appraisal of Agricultural Aspects of Resource Development Plans.

Bureau of Agricultural Economics

Other U.S.D.A. agencies

States and other Federal Departments

Following is a list of key Department of Agriculture personnel in the A.W.R. study and the responsibilities which have been assigned. Coordination and cooperative arrangements by states and Federal member agencies of the A.W.R.B. I.A.C. should be made through the person in the Department of Agriculture to which responsibility has been assigned for the particular category of work.

AGENCY	NAME AND ADDRESS	DEPARTMENT ASSIGNMENT
Office of the Secretary	John A. Short U.S. Dept. of Agriculture P.O. Box 61 Tulsa 2, Oklahoma	Department representative on the AWRBIAC, Chairman USDA Field Committee, AWR Basins.
Agricultural Research Administration (ARA)	Alvin D. Ayers U.S. Dept. of Agriculture P.O. Box 61 Tulsa 2, Oklahoma	ARA representative on USDA Field Committee. Chairman of work on agricultural research.
Bureau of Agricultural Economics (BAE)	Max M. Tharp U.S. Dept. of Agriculture P.O. Box 61 Tulsa 2, Oklahoma	BAE representative on USDA Field Committee. Chairman of work on agricultural economics.

AGENCY	NAME AND ADDRESS	DEPARTMENT ASSIGNMENT
Extension Service (Ext.)	E. P. Callahan Extension Service U. S. Dept. of Agriculture Washington 25, D. C.	Extension representative on USDA Field Committee, Chairman of work on agricultural education.
Farm Credit Administration (FCA)	Dr. P. H. Stephens Director of Research Farm Credit Administration Wichita 2, Kansas	FCA representative on USDA Field Committee, Co-chairman of work on agricultural credit.
Farmers Home Administration (FHA)	Joe Hayes Farmers Home Administration Post Office Building Oklahoma City, Oklahoma	FHA representative on USDA Field Committee. Co-chairman of work on agricultural credit.
Forest Service (FS)	Paul Swarthout U. S. Dept. of Agriculture P.O.Box 61 Tulsa 2, Oklahoma	FS representative on USDA Field Committee. Chairman of work on forestry.
Forest Service (FS)	Raymond E. Phillips c/o Regional Forester U.S. Forest Service Post Office Building Denver 2, Colorado	Chairman of work on recreation.
Forest Service (FS)	Erwin A. Schilling c/o Regional Forester U.S. Forest Service Post Office Building Albuquerque, New Mexico	Chairman of work on Fish and Wildlife.
Rural Electrification Administration (REA)	James W. Black, Jr. U.S. Dept. of Agriculture P.O.Box 61 Tulsa 2, Oklahoma	REA representative on USDA Field Committee. Chairman of work on rural electrification.
Soil Conservation Service (SCS)	Dr. H. C. Dean U. S. Dept. of Agriculture P.O.Box 61 Tulsa 2, Oklahoma	SCS Representative on USDA Field Committee. General supervision of SCS work on AWR study. Chairman of work on drainage and irrigation.
Soil Conservation Service (SCS)	L. L. Kelly U.S. Dept. of Agriculture P.O.Box 61, Tulsa 2, Okla.	Assistant to Dr. Dean. Chairman of work on waterflow retardation.
Production and Marketing Administration (PMA)	Truman J. Cunningham U. S. Dept. of Agriculture P.O.Box 61 Tulsa 2, Oklahoma	PMA representative on USDA Field Committee. Chairman of work on conservation and improvement of farm and range lands.

Institutions for Land and Water Development

I. Introduction

A. Definition of institutions

Metaphorically, institutions are the channels or limits within which human beings act as free agents. More particularly, they are the laws which regulate human association and also the organizations of humans which grow up under those laws.

B. Purpose in studying institutions

1. To know the framework within which human beings are free agents, and hence within which those economic laws which postulate mobility can operate.
2. To determine which institutions best serve ultimate social objectives. We all have somewhat different ultimate social objectives, but each of us, whatever his viewpoint, can evaluate these institutions as it helps accomplish what he thinks is important.

II. Institutions

A. Water Law

The law fails to approach the economic ideal. Water is often more difficult to transfer legally than physically, and is not allocated to its most socially lucrative uses. Riparian law allows people to prevent others from using water they are not using themselves. Appropriative law, intended to remedy this abuse, encourages people to claim more water than they use, and to use more than they need.

Within each of the subgovernmental organizations (discussed in "B" below) water is allocated among the members on a more economic basis. But among these organizations, water allocation is subject to Riparian and Appropriative law.

1. Riparian law guarantees each riparian owner that the original stream flow, undiminished and unpolluted, will always pass by his property, regardless of whether he uses the water or not. This right is subject to the equal rights of other riparian owners. Rights of various riparians may be prorated among them by a court, to allow consumptive use of water. The riparian right is in proportion to the smallest single unsubdivided ownership that has ever existed, so that an owner may lose his water right by subdividing. This institution discourages water use and land settlement.

The power of riparian owners has been hardly reduced by recent court decisions, and it still requires a large legal investment to get a decision in one's favor.

2. Appropriative law grants ownership of water to him who diverts it and puts it to beneficial use. It was originally conceived as a "right of use," and was introduced to remedy the abuses of riparian institutions. The right was established by use and was supposed to be lost by nonuse (but rarely is so lost). Since 1913, all unused unclaimed waters have been state property, and it is necessary to file with the state to appropriate them.

Appropriative rights take priority in the chronological order they were established. In dry years, "junior" appropriators get no water at all, "senior" appropriators get their usual quota (except under the Mormon system of fractional water rights).

The appropriative system causes individuals to claim more water than they need, as there is no penalty for trying to take too much, and claim it sooner than they need it, to gain priority. It encourages aggressive litigation by anyone whose water rights might be threatened by a new diversion, since 5 years of "adverse use" establish the appropriative "prescriptive right." An appropriator does not know until he actually begins diverting water, that is, after he has laid out capital, that he may be enjoined from diverting and engaged in an expensive lawsuit by someone whose interests are threatened.

3. Both riparian and appropriative rights are very difficult to transfer, and utterly impossible to transfer in small and ever-changing quantities, such as would be required for economic allocation of water.
- B. Local organizations for diverting and storing water and distributing it among individual farmers and financing these projects
1. Individual. Where individual's land is adjacent to or overlies water, and irrigation works are of small optimum size.
 2. Individual who sells to neighbors. This rather natural evolutionary form is sharply discouraged because seller liable to be declared a public utility, required to continue serving water at regulated prices.
 3. Individual who sells water to tenants or settlers on his subdivision (for example, Shoreland Properties, Pescadero; Hawkins Ditch, Hollister; Kern County Land Company; American Crystal Sugar Company, Oxnard). Seller not inhibited by being made a public utility, as he is paid for this through land rents or sales price.
 4. The Mutual or Cooperative Water Company. An evolution of form 3. The development company which subdivides a ranch for irrigated farming builds the works, and forms the Mutual and turns it over to the settlers. (In Utah, they often developed as part of the Mormon plan of cooperative settlement) So far as I know, they rarely develop on the spontaneous initiative of people already settled, as the settlement is not usually possible without the water company.

Most Mutual Water Companies are in southern California and in Utah.

5. Commercial water companies. These are simply private enterprises which undertake to deliver water to farmers in certain areas. They are regulated as public utilities. Generally, they have proved financial failures, because the value they created in the lands they served could not be used to help finance them, and because they had no means of speeding land settlement. A few persist (North Fork Ditch Company, east of Sacramento; Clear Lake Water Company, west of Woodland).
6. Districts (Irrigation, Reclamation, Water, Water Conservation, Drainage, etc.)

Quasi-governmental agencies, empowered to issue bonds and levy taxes on the included land (improvements are usually exempted). Because of this bonding and taxing power, this form of organization has been used where very expensive projects are necessary. Irrigation districts have usually been formed by settlers who had previously been getting water by other means. Irrigation districts are characteristic of the Central Valley; reclamation districts of the delta; water conservation districts of unified basins with a common ground water supply, like both the Santa Clara valleys.

Districts also serve to force recalcitrant landowners to contribute financially to projects which they will not join voluntarily. District taxes have also often forced large landowners to subdivide and sell their land to settlers, speeding up the development of the project. As the landowners had to pay taxes on their land regardless of use, slow settlement did not doom projects to failure anyway.

Districts' tax power captures some of the extended benefits of projects to help finance them. Urban areas within districts are subject to their taxes. (San Jose, Fresno, Modesto, Tracy, and Merced are examples.)

Unlike other water user's organizations, irrigation districts can sell or lease water over their boundaries temporarily, without vesting any right in the buyer. This improves water allocation.

7. Federal Projects

Generally, federal projects have been turned over to the users, organized in irrigation districts under state law. This procedure will probably be followed with the Columbia Basin and Central Valley projects; although the Bureau of Reclamation may continue to operate the dams and interdistrict works, the distribution systems will be built by irrigation districts, and payments to the federal government will be made through irrigation districts. Thus, in federal projects the institutions important for land settlement are still irrigation districts.

Federal projects open vast new possibilities for a system of economic allocation of water. The Bureau of Reclamation is fighting to avoid vesting permanent water rights in particular districts. The Bureau visualizes a vast interconnected system to distribute water to where it is most valuable, without giving permanent rights to any locality, in the Central Valley.

Federal projects also entail the famous 160-acre limitation. This law has teeth. Water from federally subsidized projects is not to be delivered to more than 160 acres (320 acres for man and wife) under any single ownership. The owner must be a bona fide resident on the land. At the discretion of the Secretary of the Interior, the size limit may be reduced. Land in excess of 160 acres cannot be sold for more than its value before the project. Excess land may be taxed by districts in which located, even though it receives no water. Thus, large owners and absentees are virtually forced to subdivide and sell for a low price.

III. Irrigation Institutions and the Subsidy Question

All the institutions above except the commercial public utilities collect "subsidies" to help finance them. Irrigation water is subject to sharply diminishing returns. It cannot be sold for more than the value of the marginal units. The inframarginal values accrue to the lands served. Commercial companies cannot touch these increased rents, although they create them. But land development companies receive them when they sell the land. Mutual water companies can collect them through stock assessments. Districts can tax them. This sort of "subsidy" is economically rational, and should not really be called a subsidy, but a return for services rendered. It is a value created by the irrigating organization that cannot be recaptured through ordinary market mechanisms, a "nonsalable benefit."

IV. Irrigation Institutions and the Land Settlement Question

All of them except the commercial public utilities gave some attention to the problem, although none of them gave enough. Most of the commercial utilities built to serve lands they did not own and were ruined by slow settlement. Sometimes large landowners deliberately retarded settlement to break the water company, so they could buy it cheap.

Land development companies, whether they subsequently evolved into private utilities, mutual water companies, or irrigation districts, had some control over land settlement because they owned the land from the start. Some, like the Holland Land Company near Clarksburg, used this control to good advantage. They did not simply sell to the highest bidder (who might have been an absentee speculator); they "picked their settler and backed him to the limit." Others, like the Mutuals of Southern California, were not in a position to be much injured by slow settlement: their revenues were from water, and water was so valuable they could sell it all for a good price even before settlement was completed. Others, like the Canadian Pacific Railway, sold to speculators from Nome to Delhi, and found serious difficulties in settlement and finance.

Irrigation districts have what I consider the most effective means of speeding settlement. Their power to bond themselves and tax land constitutes a means of extending credit to settlers at lower rates and for longer terms than is possible in private lending. To visualize this, contrast a bonded irrigation district with a comparable project in which the irrigation works were all installed and paid for. In the paid up project, the anticipated future yields of the land would be capitalized into its present selling price, and the settler would have to buy all that on his own credit or financial resources. In the bonded district, the district has already done that borrowing on its own credit, at $4\frac{1}{2}$ or 5 per cent. The interest and amortization payments are made by the settlers in the form of land taxes extending over 30-40 years. These anticipated taxes are, of course, capitalized into the original selling price of the land, so the credit to the settler is given in the form of a low land price.

This credit does not solve all the settler's credit needs, of course. It is the credit by which he buys the irrigation system (which he must inevitably buy in one way or another). Without the irrigation district bonding and taxing system, he buys it in the form of high land prices; with that system he buys the irrigation works by paying taxes for many years. Furthermore, his ability to borrow to meet other needs is somewhat enhanced because he has not had to exhaust his personal credit and financial resources to buy high-priced land.

New irrigation districts usually provided water free, and taxed on land value, not improvement value. Settlers who used water and improved their farms paid no more than absentee owners and speculators. This hastened settlement and development. The remarkable development of the famous Turlock and Modesto districts occurred under this institution.

Irrigation districts can construct distribution systems (often through subsidiary local improvement districts) which bring water to every few acres at district expense. Thus, this institution is well suited to creating a cooperative community of small family farms, in areas where costly irrigation works are necessary.

V. Conclusion

The most useful irrigation institution is, in my opinion, the district. However, what is really socially useful is not the name "irrigation district," but the functions I have associated with that name. Some mutual water companies, such as the Clark Colony MWC at Greenfield, the Natomas MWC north of Sacramento, and the Senior Canyon MWC of Ojai, function more like districts, and some districts serve no function at all. Such districts as the south San Joaquin, east Contra Costa, Modesto, Turlock, Fresno, Consolidated, Alta (in which Dinuba of Goldschmitt's study is located), and others represent the irrigation district at its best. We have much to learn from these outstanding examples of land settlement and water use.

Topic No. 8

Supplementary references

Bunce, A. C., and G. W. Collier. A Method of Estimating the Economic Effects of Planned Conservation on an Individual Farm. Washington, D. C. U.S. Dept. of Agriculture Misc. Pub. 463, 1942, 28p.

Johnson, Neil W. Analysis of the Present Program of Research in the Economics of Soil Conservation, and Suggestions for its Improvement. Washington, D. C. U.S. Bureau of Agricultural Economics, 1940. 75p. Processed.

Johnson, Neil W. "Needed Developments in the Evaluation of Soil Conservation Benefits." Journal of Farm Economics, vol. 24, no. 1, Feb., 1942, p. 139-151.

Sauer, E. L. "Methods of Evaluating Soil Conservation Measures." Journal of Farm Economics, vol. 31, no. 1, pt. 2, Feb., 1949, p. 655-659.

Taylor, M. C. "An Evaluation of 'Evaluating Soil Conservation.'" Journal of Farm Economics, vol. 29, no. 4, pt. I, Nov., 1947, p. 967-973.

Uhland, R. E. "Quantitative Basis for Evaluating Effectiveness and Application of Soil Conservation Practices." Soil Conservation, vol. 5, no. 6, 1939, p. 152-156.

Wantrup, S. v. Ciriacy. "Capital Returns from Soil Conservation Practices." Journal of Farm Economics, vol. 29, no. 4, Nov., 1947, p. 1181-1196.

Weitzell, E. C., and M. M. Regan. "Economic Evaluation of Soil and Water Conservation Measures and Programs." Journal of Farm Economics, vol. 29, no. 4, pt. 2, Nov., 1947, p. 1275-1294.

Bunce, A. C., and V. R. Swoyer. How to Estimate the Economic Effects of Soil Conservation and Farm Reorganization on the Individual Farm. Ames, 1941. (Iowa Agr. Exp. Sta.; Bureau of Agr. Economics and Soil Conservation Serv. cooperating)

The date of this publication is in doubt; the publication is not available in the Giannini Library, but is being sent for, as of May 11, 1949.

Schickele, Rainer. Economics of Agricultural Land Use Adjustment I. Methodology in Soil Conservation and Agricultural Adjustment Research. Ames 1937. p. 341-423 (Iowa Agr. Exp. Sta. Res. Bul. 209)

Questions: Review Renne Chapter 17 critically with respect to the following:

1. Definition of conservation.
2. Classification of natural resources with respect to conservation.
3. Does land conservation become an economic possibility at the point of optimum intensity?
(Consider Renne's discussions on pages 621, 622, 627, 628 and 629.)
4. Individual versus social concepts of land conservation.
5. Conservation policies.
6. Methods of controlling erosion.

Agricultural Economics 207
Supplementary Reading Topic No. 4.

A. Land Classification generalized.

National Resources Planning Board. Land Classification in the United States. Washington, Govt. Print. Off., 1941.

Kellogg, C.E. and J.K. Ableiter. A Method of Rural Land Classification. U.S.D.A. Tech. Bul. 469, 1935.

Wohlitz, L.R. The Land Capability Classification Concept. U.S. Soil Conservation Service. Processed. May 1948.

Jensen, Herbert A. A System for Classifying Vegetation in California. California Fish and Game. October 31, 1947. Pp. 199-266.

Social Science Research Council, Research in Agricultural Land Utilization Scope and Method. Bul. No. 2. 1931.

Proceedings of the First National Conference on Land Classification. The Classification of Land. Mo. Agr. Exp. Sta. Bul. 421, 1940.

U.S. Dept. of Interior, Bureau of Reclamation Manual, Vol. XIV. Land Classification Handbook. August 30, 1946. Processed.

Bureau of Reclamation, U.S. Dept. of the Interior, Region 1. Land Classification for Irrigation, presented by J. Karl Lee at the Conference on Land Classification, Corvallis, Oregon, November 1948.

Allin, Bushrod W. A Review of Salter's "Land Economics." Agr. Economics Research. July 1949, pp. 98-99.

The background of the County Land Use Planning Program referred to by Allin in this review may be found in a series of six documents issued by the United States Dept. of Agr. in 1938. Processed. The names of these documents are given in a mimeographed statement "Summary of Documents Dealing with Agricultural Planning."

B. Land utilization research and land classification in New York State and in the State of Washington.

Lewis, A.B. Methods Used in an Economic Study of Tomkins County, New York, etc. Cornell University Agr. Exp. Sta. Memoir 160, April 1934.

Lewis, A.B. Relation of Income to Capital on Farms. Newfane-Olcott area, Niagra County, New York. U.S.D.A. Farm Credit Adm. Washington, D.C., 1941.

Conklin Howard E. and Sherwood O. Berg. Developments in Land Classification Methods. Dept. of Agr. Econ. Cornell University A. E. 688. 1948. Processed.

Conklin, Howard E. Land Economics Research - New Directions - East. Paper presented at the annual meeting of the American Farm Economics Association, Laramie, Wyoming, August 19, 1949.

The technique used in Washington is fully described in each Extension leaflet containing the land classification maps and in Peterson, A.W., A.W. Buchanan, and B.D. Parrish, Economic Land Use Classification in King and Snohomish Counties, Washington, and Its Influence on Full-time Farming Returns. Wash. Agr. Exp. Sta. A. E. 5. Pullman, Washington. December 1944. And in the following:

Parrish, B.D. Definitions of Land Class and Methods Used in Mapping. Proceedings, Western Farm Economics Association, June 26, 27, 28, 1946.
Peterson, A.W. Statistical Description and Analysis of Data by Economic Land Use Class Areas. Pp. 47-60. Proceedings, Western Farm Economics Association, June 26, 27, 28, 1946.
Maugham, O.H. Credit Experience and Land Class. Pp. 61-68. Proceedings, Western Farm Economics Association, June 26, 27, 28, 1946.

C. Land utilization techniques developed in Vermont and Kentucky by C.F. Clayton.

Clayton, C.F. Land Utilization as a Basis of Rural Economic Organization. Vermont Agr. Exp. Sta. Bul. 357, June 1933.

Clayton, C.F. and W.D. Nicholls. Land Utilization in Laurel County, Kentucky. U.S.D.A. Tech. Bul. No. 289, 1922.

Clayton, C.F. Project 26 in Scope and Method. Bul. 2. Cited above.

D. Land utilization criteria and qualitative analysis suggested by J.D. Black.

Black, J.D. Projects 11 and 12. Scope and Method. Bul. 2. Cited above.

E. Land utilization procedures in California. Area analysis.

Weeks, David. Objectives of area analysis in the Northern Sierra Nevada. Journal of Land and Public Utility Economics, May 1943. Pp. 153-164. (For further references in this series see page 153 of the above citation.) Also see citation above, Jensen, on the Classification of Vegetation in California.

F. Summary of procedures, techniques, criteria, directional measures.

Questions

1. Prepare a brief outline covering section 4f.
2. What is your appraisal of techniques, criteria and directional measures in the segments of the field selected for study compared with appraisals made by Salter.

C)

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Topic 10.

Supplementary References.

Wantrup, S. V. Ciriacy. Economics of Joint Costs in Agriculture. Journal of Farm Economics, November 1941.

U. S. Department of the Interior. Columbia Basin Joint Investigations, Allocation of Repayment Charges by Class of Land. Problem 13. 1945.

Roberts, A. B. Certain Aspects of Power, Irrigation and Flood Control Projects, Appendix K, Task Force Report prepared for the Commission on Organization of the Executive Branch. U. S. Govt. Printing Office, 1949. Washington.

Questions.

1. What is the central objective of economic analysis of project design? The basic criterion?
2. How does design analysis differ from project evaluation?
3. What are the elements in economic design analysis?
4. What criteria apply when institutional, economic, physical or practical factors limit size or selection of project?
5. Briefly summarize the criteria of design and selection as they apply to single, multiple purpose, and area projects.
6. Define separable costs.
 - a. Specific.
 - b. Imputed.
7. Define joint costs.
8. State the objective in allocation of costs to purposes in multiple purpose projects (See top page 7 in Cost-benefit analysis, Chapter V).
9. Present arguments for and against inclusion or exclusion of separable costs from the benefit base in allocation of assessments according to benefits received.

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Advanced Land Economics

Topic 11. Further Consideration of the Problem of Measuring General Benefits of Land and Water Development.

Required Reading:

Sub-Committee on Benefits and Costs of the Federal Inter-Agency River Basin Committee—"Measurement of Benefits from Irrigation and Multiple-Purpose Projects." Minutes of the Forty-Seventh Meeting, Aug. 3, 1948, Mimeo. 38p. (Included with minor changes in Federal Inter-Agency River Basin Committee—Sub-Committee on Benefits and Costs Measurement Aspects, etc., Nov. 1948.)

Supplementary References:

U.S. Bureau of Reclamation—Reclamation Manual, Vol. XIII, Benefits and Costs Release, No. 1, June 23, 1947; Release No. 2, Sept. 22, 1947; Vol. XV, Project Repayment Release No. 2, June 12, 1947.

U.S. Bureau of Reclamation—Report Presented to Secretary Krug on the Central Valley Federal Reclamation Project in California. House Document No. 146, 80th Congress, 1st Session, Transmitted by a letter from the Acting Secretary of the Interior Oscar L. Chapman, Feb. 24, 1947.

U. S. Department of Commerce—Bureau of Foreign and Domestic Commerce—National Income: Supplement to Survey of Current Business, July 1947.

Keynes, John M. The General Theory of Employment, Interest and Money. New York, Harcourt Brace and Company, 1936. Chap. 18, The General Theory of Employment Re-stated, pp. 245-254.

Hanson, Alvin H. Monetary Theory and Fiscal Policy. New York, McGraw-Hill Book Co., Inc., 1949. Chaps. 4, 5 and 6. pp. 55-98.

Weeks, David and H. R. Josephson. Economic Criteria for Classifying Nonurban Land According to Probable Best Use. Journal of Farm Economics, May 1930, pp. 419-434.

Questions:

1. Enumerate the purposes of cost-benefit analysis and indicate when it would be appropriate to consider benefits of alternative uses of resources as costs. Why and on what assumptions does the U.S.B.R. not consider such alternative uses of resources. In discussing this question refer back to Chap. II in Economics of Benefit-Cost Analysis.
2. Give a general definition of benefits.
3. Differentiate between tangible and intangible benefits; between direct and indirect (or general or extended) benefits. (Explain the basic concept of direct and indirect benefits in terms of income items recognized by the U. S. Bureau of Reclamation.)

4. How may intangible benefits serve in considering the economic justification of a project.
5. Distinguish between economic justification and economic feasibility.
6. Why is a consideration of indirect benefits important?
7. Is the method used by the Department of Interior for measuring indirect benefits from irrigation consistent with their method for measuring indirect benefits from power? Compare the two procedures critically.
8. Briefly indicate how you would organize a study to improve presently recognized procedures for appraising indirect benefits.
9. How does the Department of Interior propose to use intangible benefits? State general treatment without detailed discussion of specific intangible benefits except for purpose of illustration.

AGRICULTURAL ECONOMICS 102

Land Economics

Land Economics Defined

- brings in area analysis*
1. Salter, Leonard A., Jr. The Content of Land Economics and Research Methods Adapted to its Needs. Journal of Farm Economics, Vol. XXIV, No. 1, February 1942, Page 235. "... land economics is a social science that deals with those problems in which social conduct is strategically affected by the physical, locational or property attributes of whole surface units." Salter defines whole surface units as segments of the earth's surface "which men hold as units or upon which they organize functioning whole cells or units of activity."
 2. Ely, Richard T. Outlines of Land Economics, Vol. I, Page 4. Edwards Brothers, Ann Arbor, Michigan, 1922.
"Land Economics is that division of economics, theoretical and applied, which is concerned with the land as an economic concept and with economic relations which grow out of land as property." (This first book in land economics was to have been called "Landed Property and the Rent of Land." The change in name on the original manuscript took place simultaneously with the establishment of the Division of Land Economics in the U.S. Bureau of Agricultural Economics in 1919.)
 3. Ely, R. T., and George S. Wehrwein. Land Economics. 1928 Edition. Edwards Brothers, 1928. Mimeographed.
"Land Economics is that division of economics, theoretical and applied which is concerned with the relations among men arising from their subjection of natural forces to the institution of property."
 4. Same authors as 3. 1939 Edition (Mimeo.)
Land Economics "deals with land or the material universe upon which man exercises his economic functions of working, waiting, and risk taking in his efforts to gain a livelihood" ... "As a science, land economics aims to understand present facts in regard to land ownership in all their human relationships, to explain their development in the past, and to discover present tendencies of growth. As an art, it aims to frame constructive land policies for particular places and times."
 5. Same authors as 3 and 4. Land Economics. 1940 Edition. (See preface, page V) The Macmillan Co. (Printed)
"Land Economics deals with the utilization of land by men, but more specifically with the relations of man to man arising out of the relations of men to natural resources."
- Similar*

*Beffer send city plan to Moore, forget it.
Get some spot remuneration.*

AGRICULTURAL ECONOMICS 207

Advanced Land Economics

Fall 1949

1. Sept. 19. Topic: Scope of the Field of Land Economics.

Required Reading:

Salter, Leonard A. Jr. A Critical Review of Research in Land Economics. Minneapolis, The University of Minnesota Press, 1948. Forward and Chap. I, Introduction, pp. 1-4; and Chap. II, The Development of Rural Land Economics in the United States, pp. 5-38.

Renne, Roland R. Land Economics. Table and Contents and Chap. I, The Field of Land Economics, pp. 3-19. (Read critically.)

Supplementary References:

Ely, Richard T and George S. Wehrwein. Land Economics. Preface, pp. V-VII, Table of Contents, p. IX.

Black, J. D., Editor. Scope and Method of Research in Agricultural Land Utilization. New York, Social Science Research Council. Bul. No. 2, 1931. pp. 3 - to first heading p. 15.

Ely, Richard T. and Edward W. Morehouse. Elements of Land Economics. New York, The MacMillan Company, 1924. Table of Contents and Chap. I, pp. 1-10. (11 pages)

Black, J.D., Editor. Research in Agricultural Land Tenure. New York, Social Science Research Council. Bul. 20, 1933. Table of Contents and pp. 1 to heading on page 6.

Hoover, Edgar M. The Location of Economic Activity. McGraw Hill Book Co. Inc., 1948. Particularly Chap. 6, Land Use Competition, and Chap. 11, Locational Adjustment and Problem Areas.

Questions: (Written answers required.)

1. Define land economics. *See suppl sheet*

2. Briefly summarize what you believe are the objectives of the field of land economics in a two or three page review of Renne, Chap. I, and of Salter, Chaps. I and II.

2. Sept. 26. Topic: Scientific Method in Land Economics Research.

Required Reading:

Salter, L.A. Jr. Chap. III, Scientific Method and Social Science, pp. 39-77. Chap. IV, On the Use of Publications as Methodological Evidence. Chap. VIII, Changes in Emphasis, pp. 232-241. Chap. IX, Conclusions, pp. 242-253.

Questions:

1. Do you believe that Salter's framework is adequate to test the scientific status of a research project in land economics? *ch. 3 & 9 relevant.*

2. What are your reasons for your conclusion on this point? (Reserve your written answer to these questions until all chapters of the book have been reviewed in the seminar.)

*Not required
until late in
semester*

3. Oct. 3. Topic: Review of Wisconsin Procedures in Land Utilization Research, Inventories and Correct Measures.

Required Reading:

Salter, L.A. Jr., Chap. V, Land Utilization in the Cutovers, (Total 24 pages).

- a. Review of Wisc. Bul. 318, pp. 90 to 93.
- b. { Review of Wisc. Buls. 399 and 406 } pp. 95-102
 { Review of U. S.D. A. Bul. 1295 }
- c. { Review of U. S.D.A. Circ. 160 } pp. 104-107
 { Review of Wisc. Extension Series }
- d. { Review of Wisc. Bul. 134 }
 { Review of U. S.D.A. Tech. Bul. 687 } pp. 111 to heading p. 117
- e. Review of Wisc. Bul. 139, p. 118 to first heading p. 121

Supplementary References:

Hibbard, B.H., John Swenhardt, W. A. Hartman and B. W. Allin. Tax Delinquency in Northern Wisconsin. Agr. Exp. Sta., Univ. of Wisc. Bul. 399, 1928.

Hibbard, B. H., W. A. Hartman and W. N. Sparhawk. Use and Taxation of Land in Lincoln County, Wisconsin. Wisc. Agr. Exp. Sta. Bul. 406, 1929.

Extension Service. College of Agr., University of Wisconsin. Special Circular Series on Land Utilization. See particularly:

Making the Most of Marinette County Land, 1929.

Making the Most of Forest County Land, 1931.

Langlade County, A Survey of its Natural Resources and Their Utilization, 1934.

Making the Best Use of Wisconsin Land Through Zoning, 1934.

Johnson, V. W., S. Henderson and J. H. Marshall. A Land Program for Forest County, Wisconsin. U.S.D.A. Tech. Bul. 687, 1930.

Wisconsin Conservation Department, Marinette County and the Agricultural Experiment Station, University of Wisconsin, From Public Burden to Public Benefit, The Story of Marinette County's Land Program. Wisc. Conservation Dept. Bul. 483, Jan. 1949.

Wisconsin State Department of Agriculture. A Survey of Land Cover of _____ County, Wisconsin. The cover maps for Brown, Buffalo and Pierce counties are available for inspection.

Wisconsin Department of Agriculture and Markets. Land Economic Inventory of Northern Wisconsin, Bayfield County. Bul. No. 100, 1929.

Rowlands, W. A. and F. B. Trenk. Rural Zoning Ordinances in Wisconsin. Extension Service of the College of Agr., Univ. of Wisc. Circ. 281, 1936.

Black, J. D. and L. C. Gray. Land Settlement and Colonization in the Great Lakes States. U.S.D.A. Bul. 1295, 1925.

Hartman, W. A. and J. D. Black. Economic Aspects of Land Settlement in the Cutover Region of the Great Lakes States. U.S.D.A. Circ. 160, 1931. Background.

Salter criticizes these for not emphasizing people on land, but emphasizing land, & taxes & delinquency etc.

Questions on Wisconsin publications:

1. With each bulletin assigned to you and with Salter's review of it before you, check each one of Salter's statements and determine if possible the justification of his point of view.
2. Do the bulletins assigned to you contribute anything of scientific value in your judgment besides those attributed to it by Salter?
3. What were the main techniques and criteria used in each study assigned to you?
4. What are your main conclusions concerning the function of each study assigned (to you and to other members of the class) in the general series of steps taken to solve Wisconsin's cutover land use problem?
5. Did the land and land use inventories contribute in the solution of Wisconsin's land use problems? What were their main drawbacks?
6. Enumerate and briefly describe the different measures applied in the solution of Wisconsin's cutover land use problem.
7. What is the present (1949) status of the Wisconsin land utilization program? What is your appraisal of its various phases?

4. Oct. 10. Topic: Summary of the Various Techniques of Land Utilization Analysis and Land Classification as Developed in Various Parts of the United States.

- a. "Land classification generalized."
- b. Land utilization research and land classification in New York State and in the State of Washington.
- c. Land utilization techniques developed in Vermont and Kentucky by C. F. Clayton.
- d. Land utilization criteria and qualitative analysis suggested by J. D. Black.
- e. Land utilization procedures and criteria used in California area analysis.
- f. Summary of procedures, techniques, criteria, directional measures:
 - (1) Physical basis.
 - (2) Economic analysis--procedures and criteria.
 - (3) Relation of economic classification to the broader objectives of economic analysis of land utilization.

- 2 corrective*
- (4) Directional measures.
 - (5) Notes on scope and professional background of personnel.
 - (6) Bearing on past and probable future land policies.

Required Reading:

Salter, Leonard A. Jr. Chap. VI, Land Utilization Research in Other Areas, pp. 130-174.

Supplementary Reading:

(To be supplied.)

Questions:

(To be supplied.)

5. Oct. 17. Topic: Theoretical Framework for the Valuation, Utilization and Development of Land.

Subtopic: Demand and Supply Factors in Land Development Use and Valuation.

Required Reading:

Renne, Roland R. Land Economics. Chap. 2, The Supply of Land, and Chap. 3, The Demand for Land, pp. 17-99. (Critical review)

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

6. Oct. 24. Topic: Theoretical Framework (continued).

Subtopics: a. Allocation of Resources Among the Various Uses. Significance in Relation to Land Valuation, Utilization and Development Problems. b. Theory of Land Income and Land Value.

Required Reading:

Renee, Chap. 5, Economic Processes in Land Utilization and Chap. 6, Land Rent and Income Distribution, pp. 153-221 (critical review.)

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

7. Oct. 31. Topic: Theoretical Framework (continued).

Subtopics: a. The Function of Benefit-Cost Analysis.
b. The Nature of Benefits and Costs.
c. Incidence of Benefits and Costs.

Required Reading:

Federal Inter-Agency River Basin Subcommittee on Benefits and Costs. Economics of Benefit-Cost Analysis (preliminary report). Washington, D. C., 1949. processed. Chaps. I and II. (Each chapter is pagged separately.)

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

8. Nov. 7. Topic: Theoretical Framework (continued).

Subtopic: Analysis of Costs and Benefits from Conservation.

Required Reading:

Renne, Chap. 17, Conservation of Land Resources, pp. 612-670 (critical review).

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

9. Nov. 14. Topic: Theoretical Framework (continued).

Subtopic: Principles and Problems Involved in Measuring Benefits and Costs on Multiple Purpose Projects.

Required Reading:

Federal Inter-Agency River Basin Subcommittee on Benefits and Costs. Economics of Benefit-Cost Analysis, Chap. III.

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

10. Nov. 21. Topic: Theoretical Framework (continued).

Subtopics: a. Economics of Project Formulation and Design.
b. Cost Allocation, Assessment, and Repayment.

Required Reading:

Economics of Benefit-Cost Analysis, Chaps. IV and V.

11. Nov. 28. Topic: Theoretical Framework (continued).

Subtopic: Further Consideration of the Problem of Measuring
General Benefits of Land and Water Development.

Required Reading:

(To be supplied.)

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

12. Dec. 5. Topic: Land Tenure.

Subtopics: a. Research in Landed Property.
b. Basic Concepts of Property Rights in Land.

Required Reading:

Salter, L. A. Jr. Chap. VII. Research in Landed Property,
 pp. 175-231.

Renne, Chap. 4, Land Appropriation, pp. 100-151.

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

13. Dec. 12. Topic: Land Tenure (continued).

Subtopic: Critical Review of Renne on Land Tenure.

Required Reading:

Renne, Chap. 14, Land Tenure and Tenancy, pp. 429-516.

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

14. Jan. 9. Topic: Land Tenure (continued).

Subtopics: a. Critical Review of Renne on Land Tenure (continued).
b. Relation of Land Tenure to Land Policy, Land Use
Planning, and Directional Measures.

Required Reading:

Remme, Chap. 18, Planning the Use of Land, and
Chap. 19, Future Control of Land Use. pp. 675-724.

Supplementary References:

(To be supplied.)

Questions:

(To be supplied.)

Semester Calendar, Fall, 1949

	<u>Mon.</u>	<u>Tu.</u>	<u>Wedn.</u>	<u>Thurs.</u>	<u>Fri.</u>	<u>Sat.</u>
September	19	20	21	22	23	24
September and October	26	27	28	29	30	1
October	3	4	5	6	7	8
October	10	11	12	13	14	15
October	17	18	19	20	21	22
October	24	25	26	27	28	29
October and November	31	1	2	3	4	5
November	7	8	9	10	11	12
November	14	15	16	17	18	19
November	21	22	23	--	25	26
November and December	28	29	30	1	2	3
December	5	6	7	8	9	10
December	12	13	14	15	16	17
January	--	3	4	5	6	7
January	9	10	11	12	13	14

Finals -- January 16-26

Benedict mentions

British Agr. acts of 1883,
giving tenant security of
tenure of improvements.

He regards landownership
as a 'function'.

Weeks:

valuation technique, appraisal. Take part 2 Murray, have one question on that

Capitalization formula -- by integrating, & sum geometric series.

& add project analysis

~~Proposed practises for Ec Analysis of River Basin Projects, review.~~

& go over another MS he has, "form, on B-C analysis.

~~BR manual on B-C~~

-- is bridge into social econ, why. Rest is engineering. Have a few talks before exam, on this.)

(Indirect benefits -- on N9. K, plus long term growth factors.)

✓ Forestry Valuation, formula, Chapman & Meyer p. 111-4

~~Sinking Fund Meth, depreciation, from Woods & de Garmo~~

Some defs, on costs & benefits -- direct, indirect, tangible, intang.

c.g. what i.r. should engineer use? (macro vs micro)

Why are futures discounted? Economist asks. Engineer just juggles math, doesn't ask basic questions.

~~Chap. 3 Salter -- research method aside from stat.~~

~~Ch. 2 Scope of Land Ec.~~

Define Conserv.

Classify nat. res.

Dist. social & private benefits of cons.

Time element. Different (lower) i.r. for social benefits

✓ Dist. cons & ec. of land utilization ref. ch. 17 Renne p. 621

Max. net Y conflict with cons.

Weeks disputes Warrup's def. of conserv. -- Wa. says prevention of waste is cons. Wa. puts all on shifting use to future, to treat mostly. -- makes it but wiggles.

Institution: relationship among men. for attaining objectives.

Weeks.

p. 94, Woods & de Garmo -- sinking fund formula.

Gillette formula, etc?

Does stat line deprec. ignore int. altogether?

Land banks are hardly banks, as they ~~do~~ sell bonds for their credit, & perhaps don't create M.

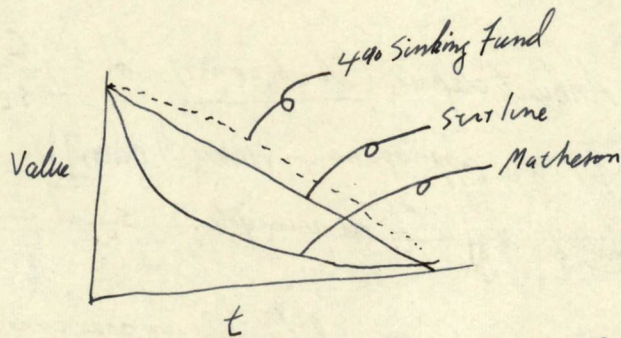
They don't lend now to new settlers but established owners. In 30s, FCA & FSA etc took over much?

Woods & de Garmo

Introduction to Engineering Economy

Physical deprec. -- time passes, machine wears out
Functional -- obsolescence, custom changes, & new inv.

1. Surt line depr. -- same amt. yrlly.
2. Maccheron formula, or constant % method -- same % yrlly. ~~Value~~ Value after one yr: $V = C - Ck$
After n yrs: $V = C(1-k)^n$
3. Sinking Fund over



Fixed % good for style items. (But most plant & equipment don't go that way.)

Few firms actually keep sinking funds, but put the M in business.

Sinking fund idea seems to be, you charge less for depr. than otherwise, because you account int. from what you've charged already toward paying off rest. --- fallacious I think. -- well, if you figure int. as cost thru entire life, then should acct for disentangling this way. [Other methods, is implied you stop acctg int. on what you disentangle] [I hope] In fact, no --- hence sinking fund method gives higher -- & correct -- figure, for ~~for~~ int. yielded by inv.

Methods of evaluation.

Historical Cost less depr.

Reproduction Cost New less depr. -- means you depreciate from present cost to present value in effect --- present value being disc'd future revenues --- so thus obviously you get to only correct valuation.

Prudent Inv. chy -- for rate regulation. ~~Future~~ Future possibilities not considered.

Intangible Values: Goodwill, franchises, (patents, ^{license} quorum, etc etc), 'going' value, & org. cost.

Annuities:

Ordinary ann., you figure first payment is ~~at~~ at end of pd.
(If at beginning, called "annuity due")

Sinking fund formula. Annual deprec. (which const) $d = \frac{C}{S_{\overline{n}|i}}$ ^{- total depreciation over life.} [where $S_{\overline{n}|i}$ means present value of annuity of 1 at approp. i.r. - wrong, I guess]
~~It considers the yield of inv. & $S_{\overline{n}|i}$ as principle. $S_{\overline{n}|i} d = C$~~

$S_{\overline{n}|i}$ is sum which would grow to be C over life. (As we are considering ~~inv.~~ int., divide by it instead of crude no. of years). It is this sum we will eventually write off, not C .

Formulae: $d = \frac{C}{S_{\overline{n}|i}}$ any year

D_A , value after A chgr, $= C \frac{S_{\overline{n}|i} - S_{\overline{A}|i}}{S_{\overline{n}|i}}$

He uses $v \equiv \frac{1}{1+i}$, uses it in basic formulae. But never mind, get that from tables, his formula is just mine rejuggled

$d = \frac{C}{S_{\overline{n}|i}}$; $S_{\overline{n}|i}$ must be present value of an annuity of 1 for no. of years of life.
It is the no. of years of life, discounted. -- & is thus the value that wd grow to equal no of years of life, at life.

$$\begin{aligned} S &= a + a^2 + \dots + a^n \\ aS &= a^2 + \dots + a^n + a^{n+1} \\ S - aS &= a - a^{n+1} \\ S &= \frac{a - a^{n+1}}{1 - a} \end{aligned}$$

Remember above for inf series.
& work on rest.

Or could integrate ... annual yield as $f(t)$, viz $\sum_{t=0}^{\infty} \frac{f(t)}{(1+i)^t}$